SNIPING

TABLE OF CONTENTS



CHAPTER 1

INTRODUCTION

Section I. GENERAL

1101. DEFINITION

A Marine Corps sniper is defined as a Marine who has been carefully screened and selected, has undergone comprehensive training in advanced infantry and marksmanship techniques, and has been assigned MOS 8541. The sniper's training, combined with the inherent accuracy of his rifle, firmly establishes him as a valuable addition to the weapons available to the infantry commander.

1102. MISSION

The primary mission of a sniper in

combat is to support combat operations by delivering precision fire on selected targets from concealed positions.

Section II. SNIPER ORGANIZATION

1201. OPERATIONAL CONCEPT

The two-man sniper team is the basic operational organization for the employment of snipers. These teams will be trained and maintained on an additional/collateral duty basis within the infantry battalions and the reconnaissance battalions.

1202. SNIPER TEAM

Each sniper team should consist of a leader (corporal 0311/8541) and a scout-sniper (lance corporal 0311/8541). Each team is equipped with a sniper rifle with telescopic sights, a standard service rifle, and a wide-angle binocular for observation and target seeking. Each sniper will be armed with the pistol, caliber .45, in addition to the rifle.

1203. RESPONSIBILITIES

a. Battalion Commanders. --The infantry and reconnaissance battalion commanders are responsible for the assignment and training of sniper teams on an additional/collateral duty basis. As a minimum, sufficient teams should be trained to permit assignment of one team to each rifle or reconnaissance company as required.

b. Sniper Employment Officer. --One officer or staff noncommissioned officer within the battalion headquarters should be assigned additional duty as sniper employment officer directly responsible to the battalion commander

for the operational efficiency of the designated sniper teams. He advises the commander in matters of sniper employment, supervises sniper training, and ensures that proper maintenance and security is provided for sniper weapons and equipment.

c. Team Leader. --The sniper team leader is responsible for the effective employment of his team and the care of its weapons and equipment. When attached, he assists the commander of the supported unit in the control of the team and makes recommendations relative to team employment.

Section III. SELECTION OF PERSONNEL

1301. GENERAL

Candidates for sniper training must be carefully screened. The rigorous training program and the great personal risk in combat require high motivation and the ability to learn a variety of skills. Aspiring snipers must have an excellent record and be screened by their unit commander to determine their potential aptitude as a sniper.

1302. REQUIREMENTS

a. Marksmanship. --The sniper trainee must be an expert marksman. Repeated annual qualification as expert is most desirable. Successful participation in the annual competition-in-arms program and an extensive hunting background also indicate a good sniper potential.

b. Physical Condition. --The sniper, often employed in extended operations with very little sleep, food, or water, must be in outstanding physical condition. Good health means better reflexes, better muscular control, and more stamina. The self-confidence and control which come from athletics, especially team sports, are definite assets to a sniper trainee.

(1) Glasses. --Glasses are a liability to a sniper. Although many expert riflemen and fine combat Marines wear them, glasses reflecting light can betray a sniper's concealment. Eyesight is the sniper's prime tool and he can be rendered helpless by losing or damaging his glasses.

(2) Smoking. --A sniper should be a nonsmoker. Smoke or an unsuppressed smoker's cough can betray the sniper's position, and even though he may not smoke while on a mission, refrainment may cause nervousness and irritation which lower his efficiency.

(3) Left-Handedness. --Unless highly qualified, a sniper should not be a left-handed rifle shot. The additional movement required to operate the bolt over the top of the scope increases the danger of detection.

c. Mental Condition. --An infantry Marine, in the heat of battle, kills the enemy emotionally and reflexively, lest he be killed himself. A sniper, however, must kill calmly and deliberately, shooting carefully selected targets. He must not be susceptible to emotions of anxiety or remorse. Candidates, for instance, whose motivation towards sniper training rests mainly in the desire for prestige which may accrue to them from performing a unique function, may not be capable of the cold rationality which the sniper's job requires. A proper mental condition cannot be taught or instilled by training. Psychiatric screening must determine that certain essential mental qualities are inherent to the candidates.

(1) Intelligence. --A sniper's duties require a wide variety of skills. He must learn, for example, ballistics, ammunition types and capabilities, adjustment of optical devices, radio operation and procedure, observations and adjustment of artillery fire, map and compass reading, and military intelligence collecting and reporting. In sniper team operations involving prolonged independent employment, the sniper must display effective decisiveness, self-reliance, good judgment, and common sense. Trainees must be selected from personnel of high intelligence level.

(2) Equanimity. --Many well-disciplined individuals can rapidly compose themselves after a fleeting surrender to excitement, fear, or indecisiveness. But, in the sniper's profession, even an instant of uncontrolled

emotion can be fatal. The sniper must possess true equanimity, a perpetual self-possession and serenity which fosters maturity and patience.

d. Fieldcraft.--The sniper must be able to reach his firing position undetected and must be able to use such indicaters as unusual behavior of wildlife to locate his target. A background in the outdoors, such as a trapper, forest ranger, etc., will often identify a potential sniper.



CHAPTER 2

SNIPER TRAINING

Section I. GENERAL

2101. SCOPE

a. Purpose.--The information contained in this and the following chapters is intended to provide uniform method and guidance in sniper training. The procedures and techniques used herein are predicated on the assumption that the candidate, when selected for sniper training, is an outstanding Marine who possesses a high degree of proficiency in marksmanship and tactics.

b. Objectives.--The training objectives are to develop in every potential sniper:

(1) The confidence, will, knowledge, and skills required to become an effective sniper.

(2) The ability to instinctively apply correct procedures and techniques when

functioning in combat whether as an individual or as a team member.

c. Training Program.--The degree of proficiency attained by a sniper is directly related to the instruction he receives. A well-organized sniper training program will offer the following subjects in the sequence shown: (See app. B for a syllabus of training.)

(1) Sniper equipment.
(2) Care and cleaning of equipment.
(3) Marksmanship training.
(4) Target detection.
(5) Range estimation.
(6) Holds and leads.
(7) Intelligence collection and reporting.
(8) Camouflage and concealment.
(9) Individual movement.
(10) Survival, evasion, and escape.
(11) Arm-and-hand signals.
(12) Employment in combat.

d. Other Considerations.--The following additional points should be considered in planning sniper training:

(1) Level at Which Conducted.--Small units are not capable of providing adequate sniper training. A uniform syllabus and quality instruction can be guaranteed only in a centralized school under regiment or division control.

(2) Equipment.--The sniper must be furnished the best available equipment.

(3) Incentive.--Competition should be arranged as often as possible among sniper teams and between the sniper platoons.

(4) Instruction Objectives.--Every period of instruction must have an objective which the sniper can understand. He must know what he is expected to be able to do or what he is to have learned by the end of each period of instruction.

(5) Qualified Instructors.--The

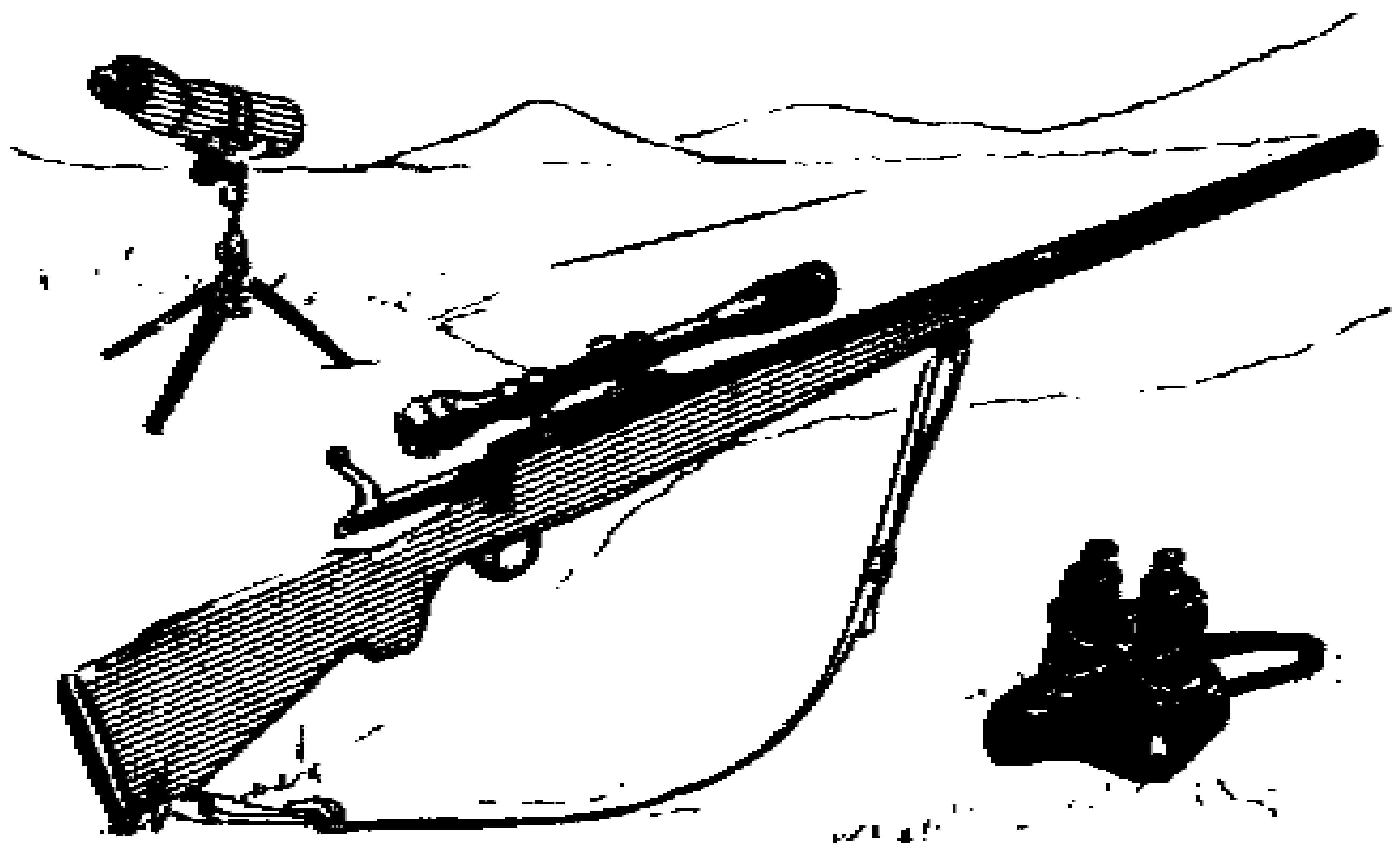
instructors must have a thorough knowledge of the principles and techniques outlined in this manual.

(6) Standards of Achievement.--High standards of achievement in marksmanship and field subjects must be set and maintained for each trainee. The Sniper Qualification Course (see app. C) establishes the marksmanship proficiency level expected of Marine Corps sniper candidates. A common measure of field subjects proficiency cannot be applied since each trainee's knowledge will vary with background and length of service.

(7) Additional Training.--Sniper training, when feasible, should also include use of the compass, terrain appreciation, adjustment of artillery fire, telephone procedure, and message writing.

(8) Team Training.--The team aspect of sniper training should be emphasized at all times to ensure optimum effectiveness of the sniper/observer team during employment.

but not to the extent that one sniper could not operate alone when warranted."



CHAPTER 3

SNIPER EQUIPMENT

Section I. RIFLE AND TELESCOPE

3101. GENERAL

To attain the required degree of proficiency, the sniper must be trained in the use of special items of ordnance and equipment peculiar to his role. He will learn to use a rifle equipped with a telescopic sight having long-range capabilities; observation aids, such as scopes and binoculars; competition grade ammunition; and other items such as compasses, maps, range cards, and night firing devices. He must know the proper techniques in the use of this equipment and familiarize himself with its capabilities and limitations. He must also constantly apply preventive and corrective maintenance to ensure long life and the proper operation of his equipment. This section will



Figure 1.--Rifle, 7.62mm Sniper, M40.

discuss the sniper's rifle and scope.

3102. SNIPER RIFLE

The sniper rifle used by the Marine Corps is a commercial model, bolt action, 7.62mm rifle with a medium heavy barrel for improved accuracy. It is fitted with a top mounted telescope base to which the sniper scope can be readily attached without special tools. Although the tabulated data for this rifle cites the maximum range as 1,000 meters, snipers have made kills at greater ranges.

a. Rifle, 7.62mm, Sniper, M40.--The M40 sniper rifle is a bolt action, shoulder weapon, (see fig. 1) and is furnished with a special carrying case (see fig. 2) of lightweight metal construction with force fitted top and bottom liners. These liners, made of sponge rubber, are not designed to fit the rifle but are to hold the rifle and scope in position when the case is closed. There is ample room inside the case for cleaning gear and accessories.

(1) Safety.--The safety lever is

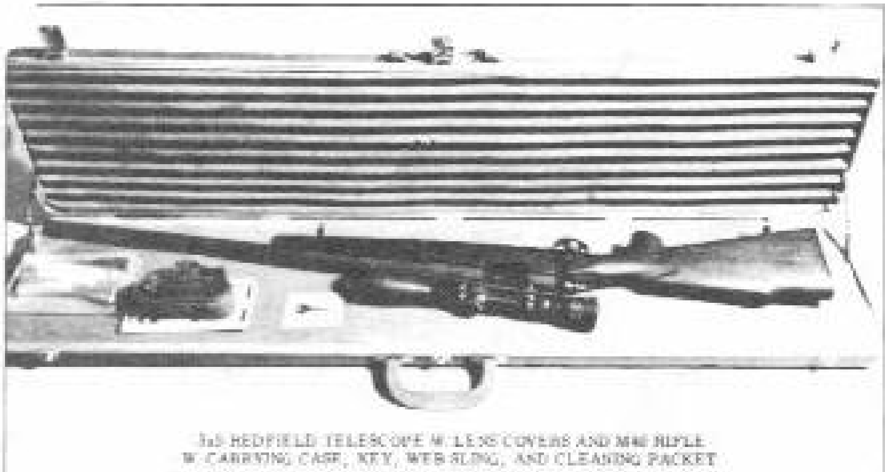


Figure 2. --M40 Rifle With Special Carrying Case.

located at the right rear of the receiver tang, behind the bolt handle. When in the forward position, it is ready to fire; when to the rear, it is safe.

(2) Bolt Stop Release. --A bolt stop release is located inside the trigger guard just forward of the trigger. When depressed, it allows the bolt to be removed from the rifle.

(3) Floor Plate Latch. --The floor plate latch is in the front end of the trigger guard. When the serrated detent inside the guard is depressed, the floor plate and ammunition are released. (See fig. 3.)

(4) Telescope Mounting. --The receiver ring and bridge are drilled and tapped for mounting the telescope.

(5) Tabulated Data

Caliber	7.62mm, NATO
Length	43.5 inches
Weight........	8 pounds, 10 ounces
Weight with Redfield scope...	9 pounds, 8 ounces
Barrel length (medium heavy)	24 inches
Lands and grooves	6
Twist, right hand	1 turn in 10 inches
Trigger weight (recommended)	3 to 5 pounds
Magazine capacity.....	5 rounds
Maximum effective range	1,000 meters

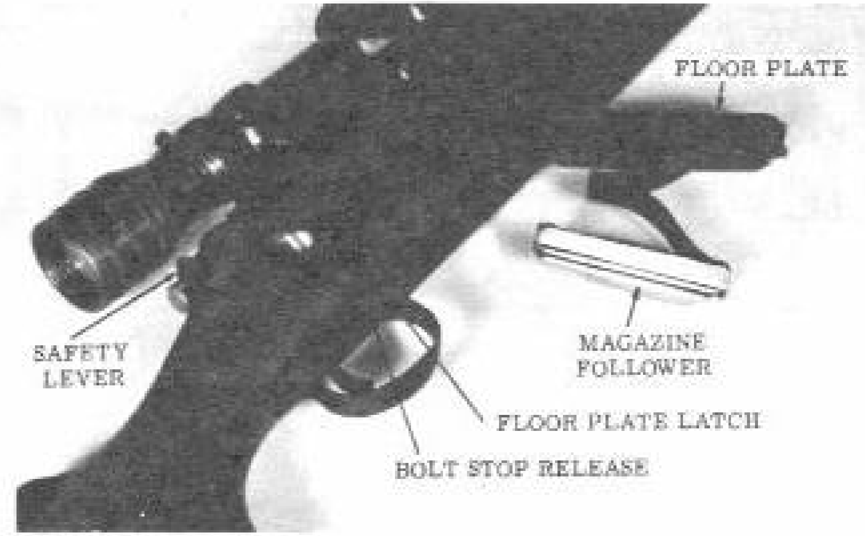


Figure 3. --M40 Rifle Showing Safety, Bolt Stop Release, and Floor Plate Latch.

3103. RIFLE TELESCOPE

a. General. --The point accuracy requirement for snipers necessitates the use of advanced sighting equipment in conjunction with the most accurate rifle available. The sights should contain precision ground lenses of the highest quality for

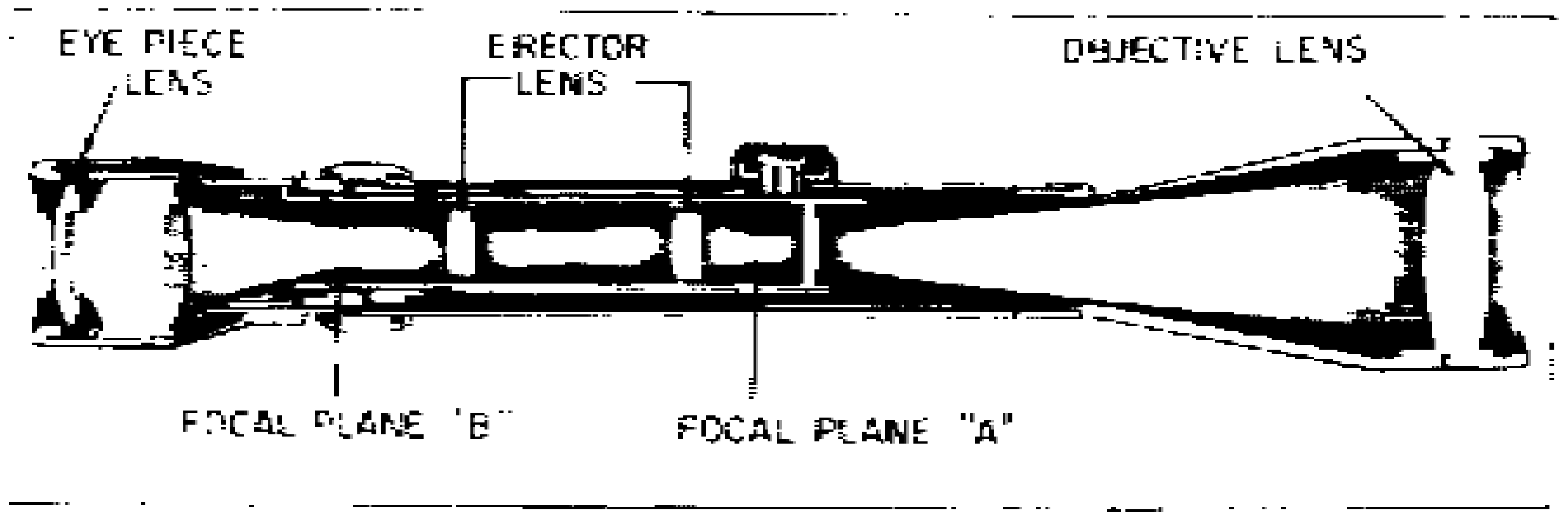


Figure 4. --Optical System.

clarity and magnification. The fine reticles or crosshairs permit an unobstructed view of the target and facilitate exact placement of the sights on any portion of the target. The telescope that the Marine sniper will use is the Redfield 3x9 variable. It is a precision instrument of rugged construction and can be easily mounted on the sniper rifle.

(1) Optical System. --The optical system (see fig. 4) consists of an objective lens which produces, at focal plane "A," an image of the target which is upside down and backward. The erector system "looks at" this image and produces another image partially magnified at point "B," and returns the image to its correct position. The eyepiece lenses then magnify the true image for the eye to see.

(2) Resolving Power. --Resolving power is the ability of the eye to distinguish detail in ideal light. (See fig. 5.) The average unaided eye can distinguish 1-inch detail at 100 yards. Magnification, combined with good design of optics, permit resolution of this 1-inch divided by the magnification. Thus, a 1/4-inch detail can be seen with a 4X scope and 1/6-inch detail with a 6X. An object viewed from 600 yards through a 6X scope will have the same clarity as though viewed by the naked eye from 100 yards.

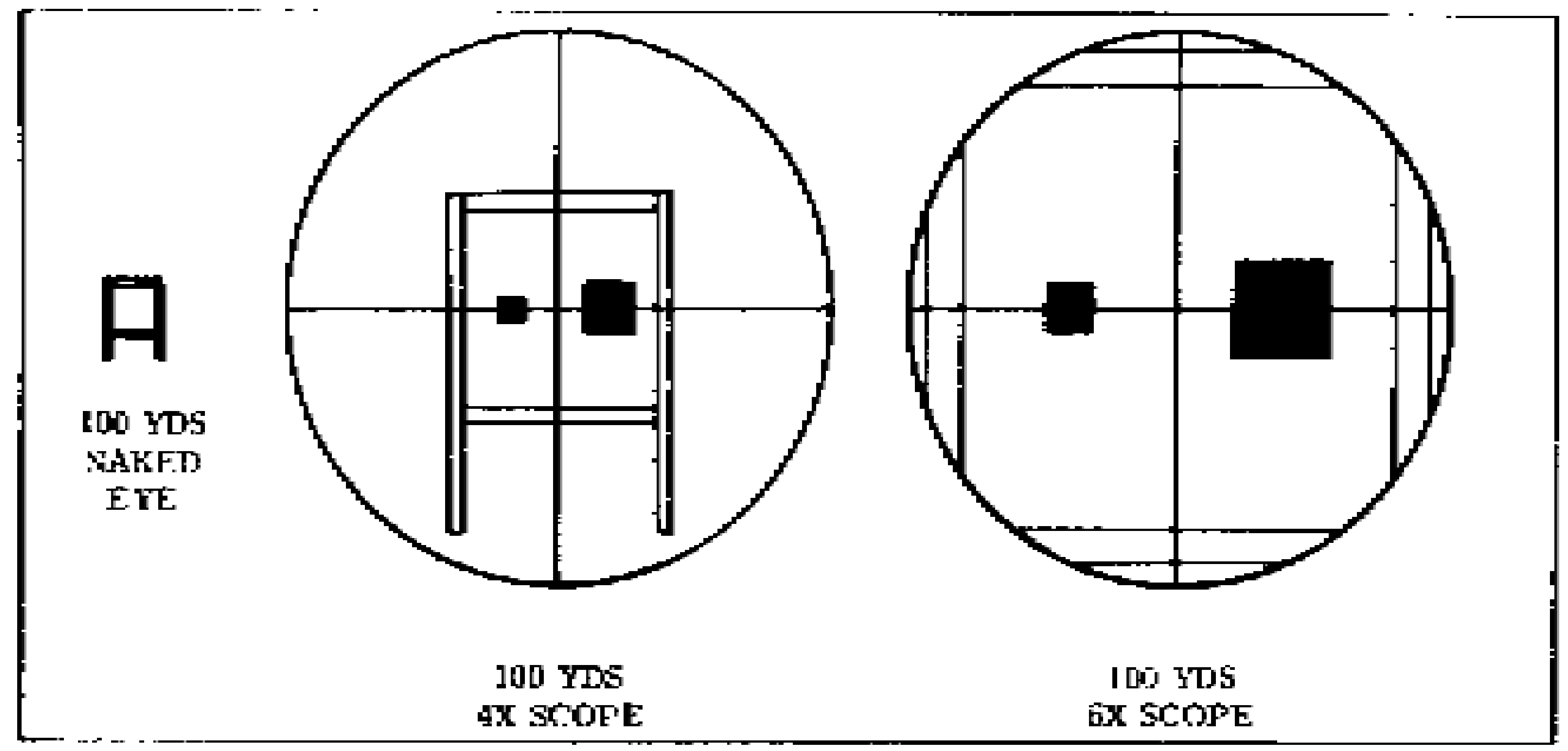


Figure 5. --Resolving Power.

(3) Lens Coatings. --Lens surfaces are coated with a hard film of magnesium fluoride for maximum light transmission. Proper coating increases the transmission to at least 86%. With uncoated lenses, about 45% of the light entering the scope is lost.

(4) Exit Pupil. --The same circle of light seen in the eyepiece lens when a scope is held at arm's length is called the exit pupil. To allow for noncritical alignment of the eye on the scope axis when in an awkward or quick shooting position, the exit pupil should be slightly larger than the pupil of the human eye. This is known as "eye freedom."

(5) Field of View. --Field of view is the diameter of the picture seen through a scope and is usually expressed in "feet at hundreds of yards." (See fig. 6.) Generally, the higher the power, the smaller the field. While a wide field may help locate moving enemy more readily, there are practical limits. The widest fields are most frequently achieved at the expense of other desirable characteristics such as power magnification, eye relief,

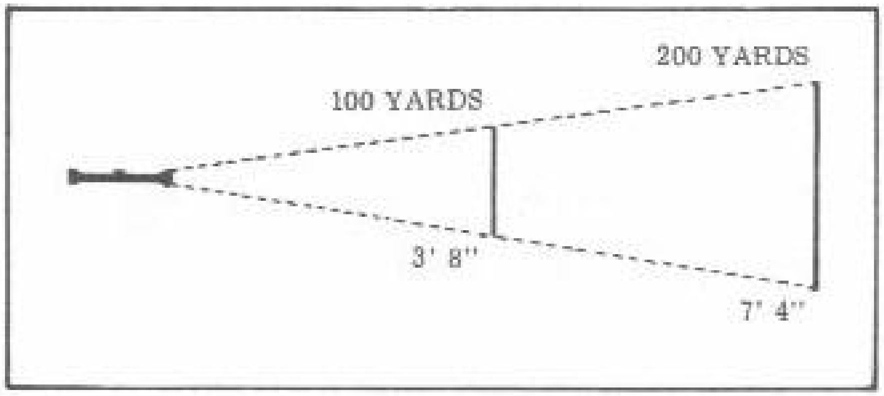


Figure 6. --Field of View.

and clarity to the edge of the field.

b. Telescope, Redfield, 3x9 Variable. --The rifle telescope, 3x9 variable, is issued with the rifle, caliber 7.62, model 40. (See fig. 7.) The telescope and the mount are numbered to correspond with the serial number of the rifle to which they are factory matched. The telescope must be properly mounted and adjusted. When mounted, the locking screws must be tightened to prevent any movement of the scope, or loss of zero will result. Adjustment for focus and eye relief must be made before use.

(1) Tabulated Data

Weight	12.5 ounces
Length	12 3/4 inches
Magnification (variable)	3x9 power adjustable
Eye relief	Between 2 and 3 inches
Adjustments	Internal (1/2-minute graduations
Reticle	Crosshairs
Lenses	Coated

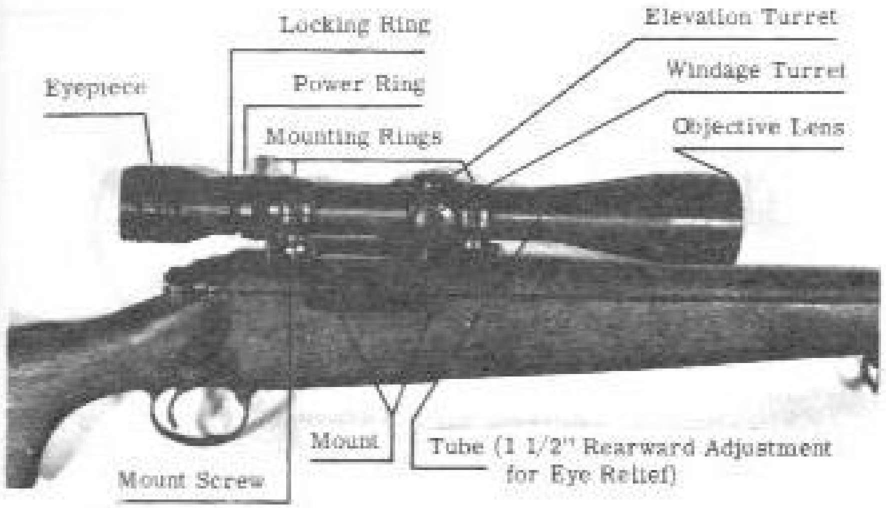


Figure 7. --Telescope, Rifle, Redfield 3x9 Variable.

(2) Adjustments

(a) Focus. --It is vitally important that the Redfield scope be focused to the individual's eye. With the scope at its highest power setting, the eyepiece is adjusted until the reticle is out of focus. (Since this telescope is equipped with a non-removable eyepiece, there need be no concern about its accidental removal.) The scope is pointed at a bright background and the eyepiece is readjusted until the reticle appears sharp and clear to the glance. THE EYEPIECE IS LOCKED IN FOCUS WITH A KNURLED LOCKING RING AND MUST NOT BE CHANGED.

(b) Parallax. --The telescope has

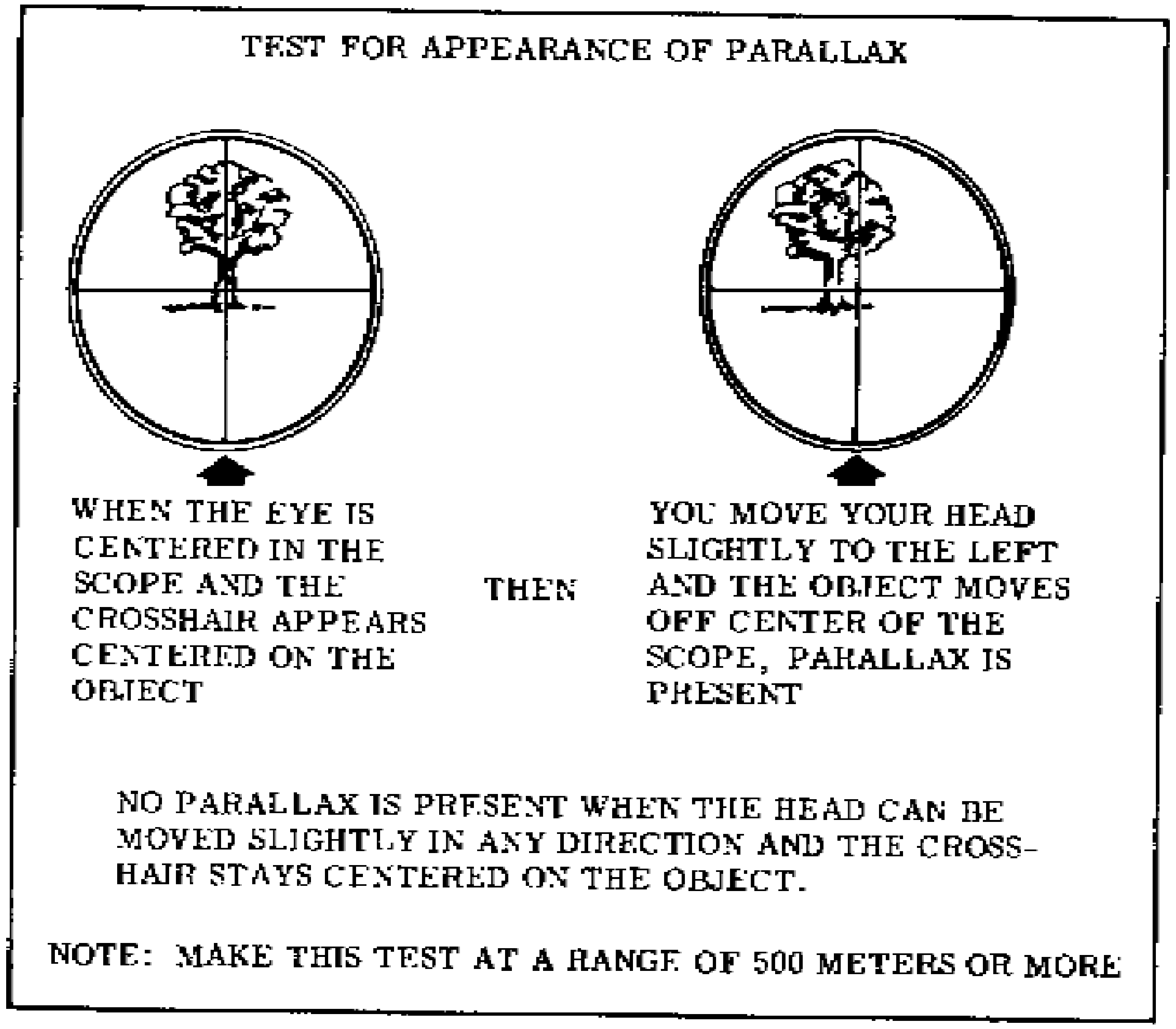


Figure 8.--Test For Parallax.

been factory adjusted for parallax and requires no adjustment by the sniper. The Redfield variable is adjusted parallax-free at approximately 100 yards. At distances other than 100 yards, the scope will exhibit an amount of parallax too small to be significant. FACTORY TOOLS ARE REQUIRED FOR ADJUSTING PARALLAX ON THIS SCOPE. ONLY AUTHORIZED PERSONNEL WILL MAKE ADJUSTMENTS. (See fig. 8.)

(c) Eye Relief.--When issued, the telescope is set all the way forward in the mounting rings. There are only about 1 1/2 inches

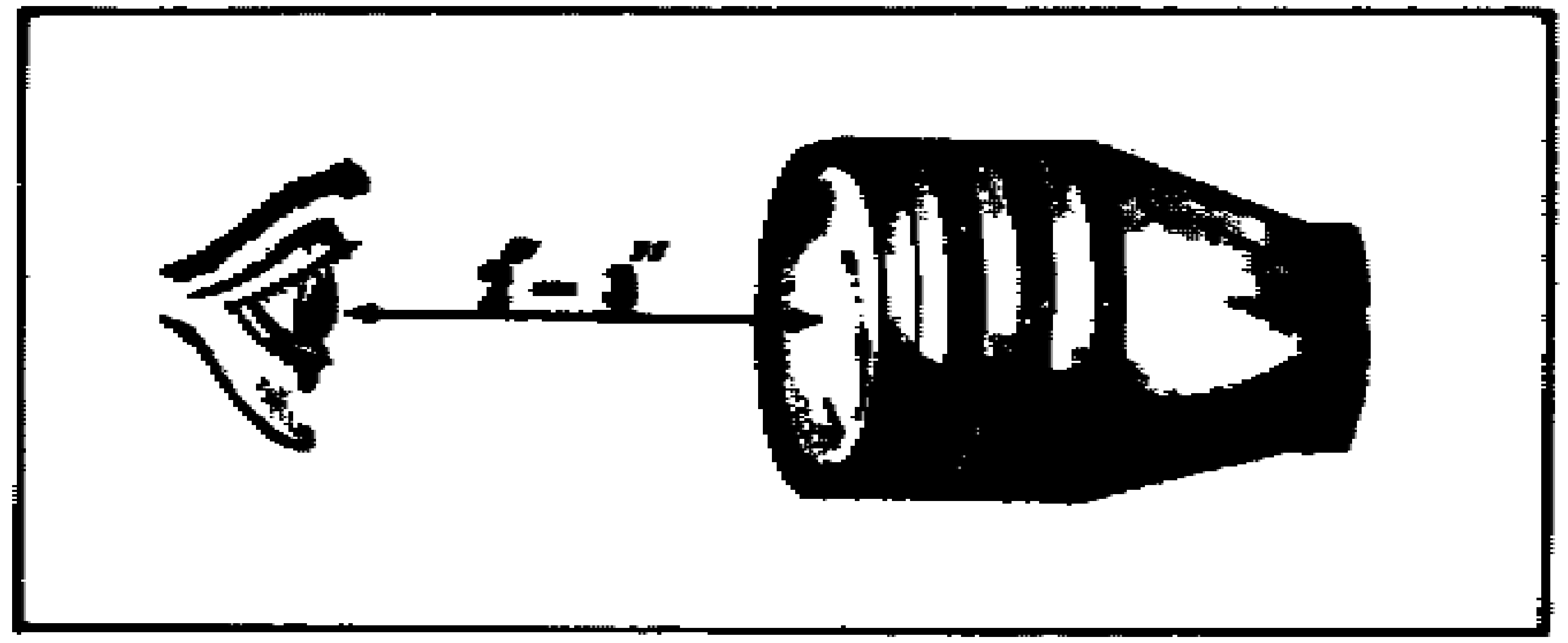


Figure 9.--Eye Relief.

of rearward movement possible. (See fig. 9.) Since the scope cannot be moved forward, it may become necessary for the sniper to move his head back on the comb of the stock until a full field of view is seen through the glass. CAUTION: THE TELESCOPE IS POSITIONED ABOVE AND EXTENDS TO THE REAR OF THE RECEIVER BRIDGE CAUSING THE HEAD TO BE HELD HIGH FOR SIGHTING. IF THE PROPER EYE RELIEF AND SPOT WELD ARE NOT MAINTAINED, RECOIL MAY CAUSE THE SHOOTER TO RECEIVE A BLOW ON THE FOREHEAD.

(d) Turret Caps.--The elevation and windage turrets are covered with threaded weatherproof caps which, when removed, expose adjustment screws which can be operated with a thin coin or key. When fully in place, the caps pull down snugly against small rubber rings around the bases of the assembly, forming a moisture seal. When the scope is not in use or during movement to and from position, the caps will be in place on the telescope.

(e) Power Selector Ring.--The power selector ring (see fig. 7) on the Redfield

telescope controls the power of magnification and the range-finding functions of the scope. The selection of the proper power to engage targets will become evident to the sniper as his training progresses. He will find that he must use lower power to increase light gathering qualities during periods of reduced visibility; that higher power causes a more pronounced movement of the crosshairs; and that higher powers are better for penetrating heavy foliage and shadowed areas. As a general rule, he should shoot with the lowest power magnification consistent with clarity of the target.

1 Magnification.--The telescope features a power selection adjustment for identifying targets under varied conditions. The power of magnification is variable from three to nine. Numbers corresponding to the power are engraved on the power selector ring for ease of selection. The ring is rotated until the number indicating the desired power is opposite the stationary white dot at the top of the telescope.

2 Range Finding.--The telescope has two parallel, horizontal reference lines in addition to the crosshairs. (See fig. 10.) These lines are stationary and the distance between them represents 18 inches of measurement on the target, the distance from shoulders to belt on the average man. By adjusting the power, the target will appear either larger or smaller, as necessary, to fit that area between the two reference lines. The manipulation of the power ring causes the range scale in the lower right quadrant of the scope to slide up and down exposing the correct range to the target after the reference lines are properly superimposed on the target. The sniper then reads the range from the scale, adjusts his sight, selects power desired, and fires. At ranges greater than 600 yards, superimpose the two parallel, horizontal reference lines on a 36-inch reference area on the target; i.e., the average distance between the

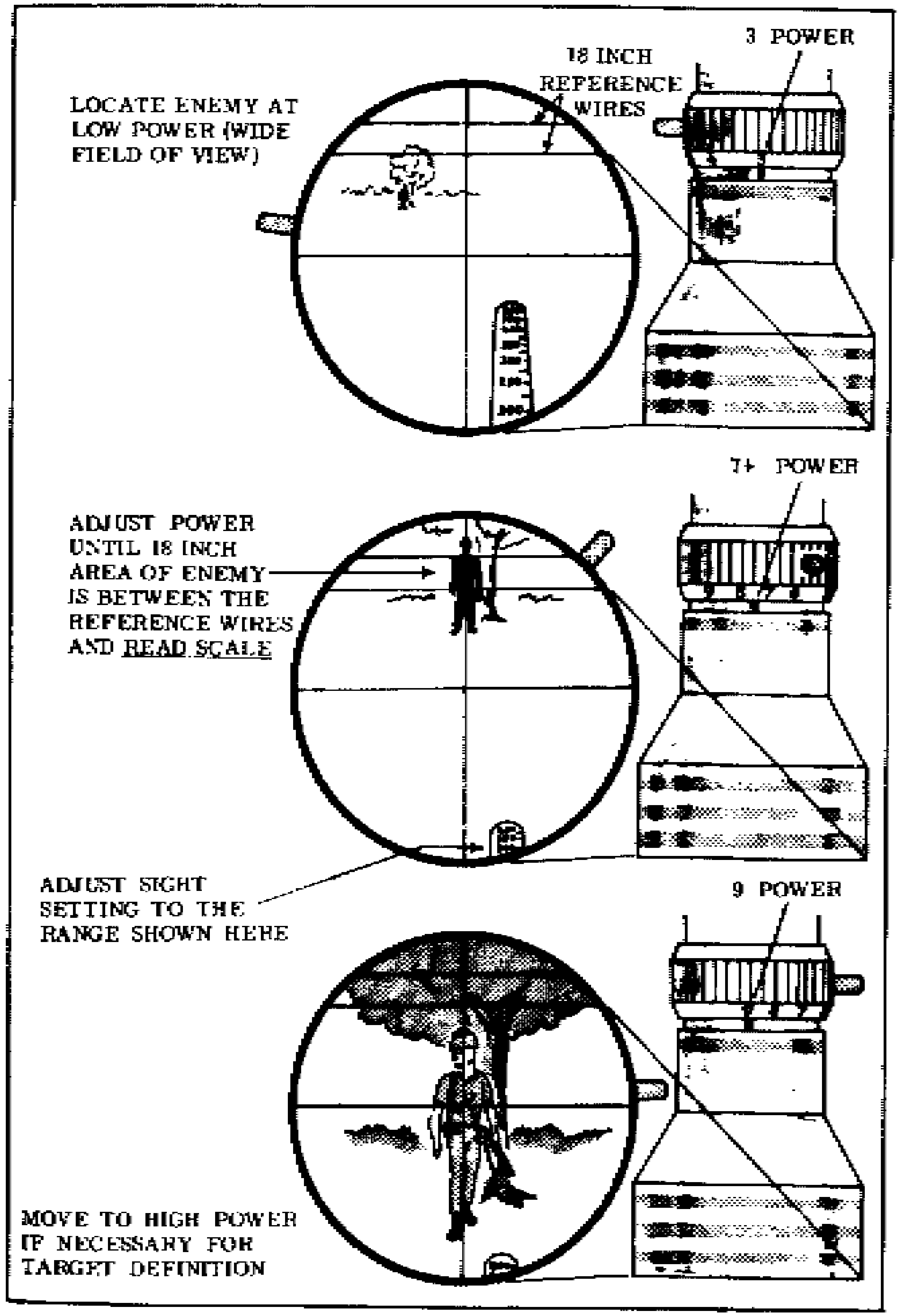


Figure 10. --Range-Finding Reference Lines.

knees and shoulders of a standing man. Again, the manipulation of the power ring causes the range scale in the lower right quadrant of the scope to slide up or down exposing a numeral. By doubling this numeral, the range to the target is obtained. The sniper then adjusts his sight, selects power desired, and fires.

3 Power and Range Scale Relationship.--As the power is increased or decreased, there is a corresponding increase or decrease of range visible on the range scale. This relationship is as follows:

Range Scale Reading	Power
600 yards (549 meters)	8-9
500 yards (457 meters)	7
400 yards (366 meters)	5-6
300 yards (274 meters)	4
200 yards (183 meters)	3

(f) Reticles.--The reticles are constantly centered and nonmagnifying. They appear finer when the power is increased and thicker as power is decreased. This feature is especially desirable at long ranges and at night. At long ranges, the target appears smaller and a heavy reticle would completely blot out the target. The fine reticle allows pinpoint aiming. Under artificial illumination and during periods of diffused lighting, reticles will fade out. At these times, it is desirable to lower the power until the reticle is visible.

3104. MOUNTING THE TELESCOPE

After the sniper has become familiar with the telescope, he must learn to mount it on the rifle. An incorrectly mounted telescope can cause a constantly changing zero, damage telescope mounts, and generally contribute to inaccuracy.

a. Mounting the Redfield Telescope.--The Redfield telescope is designed to be mounted on the



Figure 11.--Redfield Telescope and Mount Showing Mounting Lug and Recess.

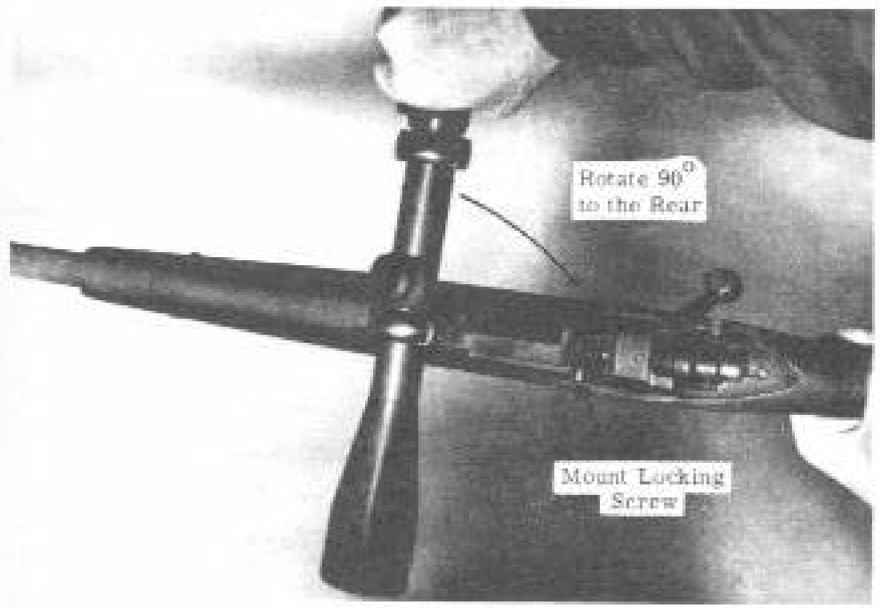


Figure 12.--Mounting the Redfield Telescope.

M40 rifle. The telescope mount is attached to the rifle by three screws. The forward end of the telescope mount is recessed to accommodate the lug which protrudes from the front mounting ring of the telescope. (See fig. 11.) When mounting the telescope to the rifle, the correct procedure is as follows:

(1) With the rifle in the horizontal position, the lug and recess are mated with the scope at a 90-degree angle to the weapon. (See fig. 12.)

(2) The scope is rotated and the eyepiece is brought to the rear until the telescope and mount are aligned.

(3) The rear mounting lug is positioned on the telescope mount by a lock screw on each side. These screws also serve as a means for making coarse windage adjustments when zeroing the weapon.

Section II. AMMUNITION

3201. GENERAL

Whenever possible, the sniper will be supplied with match grade ammunition because of its great accuracy and reduced sensitivity to wind deflection. However, match ammunition may not always be available. or the situation may dictate the use of other ammunition. Therefore, the sniper must be familiar with all types. Ammunition he will use is caliber 7.62mm which is 2 13/16 inches long overall. (See fig. 13.) The sniper will find that in ammunition other than match, both accuracy and point of impact varies among lots. He should try to identify an especially accurate lot number and use it exclusively as long as it is available.

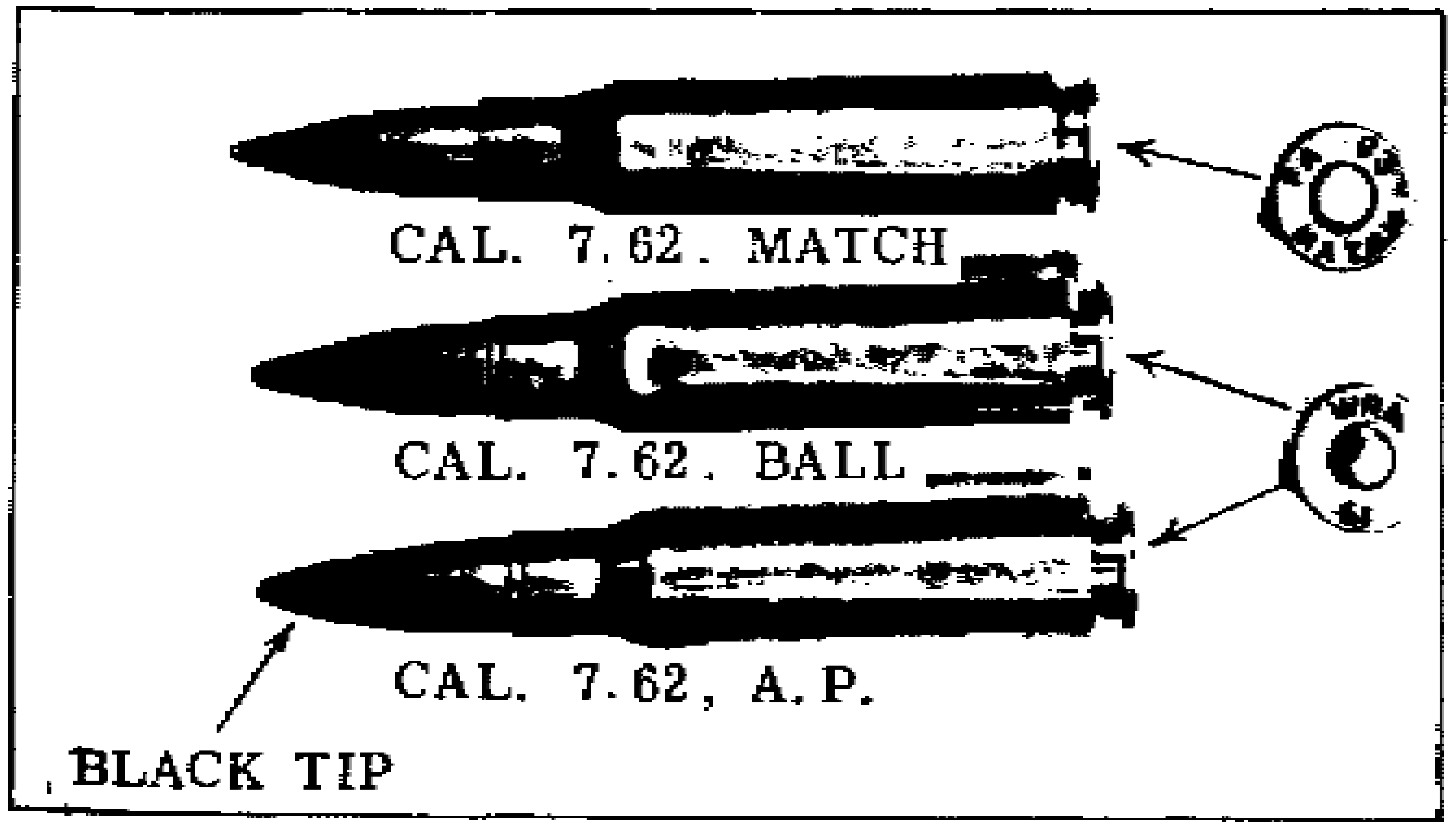


Figure 13.--Ammunition.

3202. TYPE AND IDENTIFICATION

a. Match.--Caliber 7.62mm M118 is identified by the word MATCH stamped on the head, the last two digits of the year of manufacture, and arsenal identification letters (e.g., L.C. identifies Lake City). The M118 has a 173-grain boattail bullet, a velocity of 2,550 feet per second, and an accuracy specification of 3.5 inches mean radius at 600 yards.

b. Ball.--Caliber 7.62mm M80 and M80E1. The M80 and M80E1 fire a boattail, 147-grain bullet. The head is stamped with date and arsenal identification letters. The M80E1 is the most accurate of the ball ammunitions. Both have a velocity of approximately 2,750 fps.

c. Armor-Piercing.--Caliber 7.62mm M61. The head is stamped the same as ball ammunition. Projectile tips are painted black. Velocities are between 2,700 and 2,750 fps.

d. Tracer.--Caliber 7.62mm M62. The head is stamped the same as ball ammunition. Projectile tips are painted red or orange, and the velocity is 2,750 fps. The tracer element burns to a range of 900 meters.

3203. VARIANCE OF AMMUNITION

Many shooters mistakenly believe that any ammunition of a given caliber, when fired from the same rifle, will impact in the same place. Differences in the weights of the projectiles or powder, in the diameters of the bullets, or even similar components manufactured by different arsenals will vary the strike of the bullet even though the rounds are fired through the same barrel. It is essential, therefore, that the sniper establish zeros for the various types of ammunition. The cartridge caliber 7.62mm M118 MATCH is the sniper's standard

ammunition and is also the heaviest and slowest ammunition that will be encountered in the field; therefore, it is safe to assume that all other types used in combat will strike higher on the target.

Section III. OBSERVATION AIDS

3301. GENERAL

The sniper's success in moving against the enemy and locating and shooting selected targets without betraying himself is dependent upon his powers of observation. This section will discuss some of the tools which the sniper uses to enhance his tasks of observation: the M49 telescope, the binocular M17A1, and range cards. A night observation and firing aid, the Starlight Scope, will be discussed in section IV.

3302. OBSERVATION TELESCOPE M49 AND TRIPOD M15

a. General.--The M49 observation telescope (see fig. 14) is a prismatic optical instrument of 20-power magnification. It is carried by sniper teams whenever justified by the nature of a mission. The lenses of the telescope are coated with a hard film of magnesium fluoride for maximum light transmission. This coating together with the high magnification of the telescope makes observation and target detection possible when conditions or situations would otherwise prevent positive target identification. Camouflaged targets and those in deep shadows can be distinguished, troop movements can be observed at great distances, and selective targets can be identified more readily.

b. Operation.--The eyepiece cover cap and objective lens cover must be unscrewed and removed from the telescope before it can be used. The cap and cover protect the optics when the telescope is not in use. The eyepiece focusing sleeve is turned clockwise or counterclockwise until the image can be clearly seen by the operator.

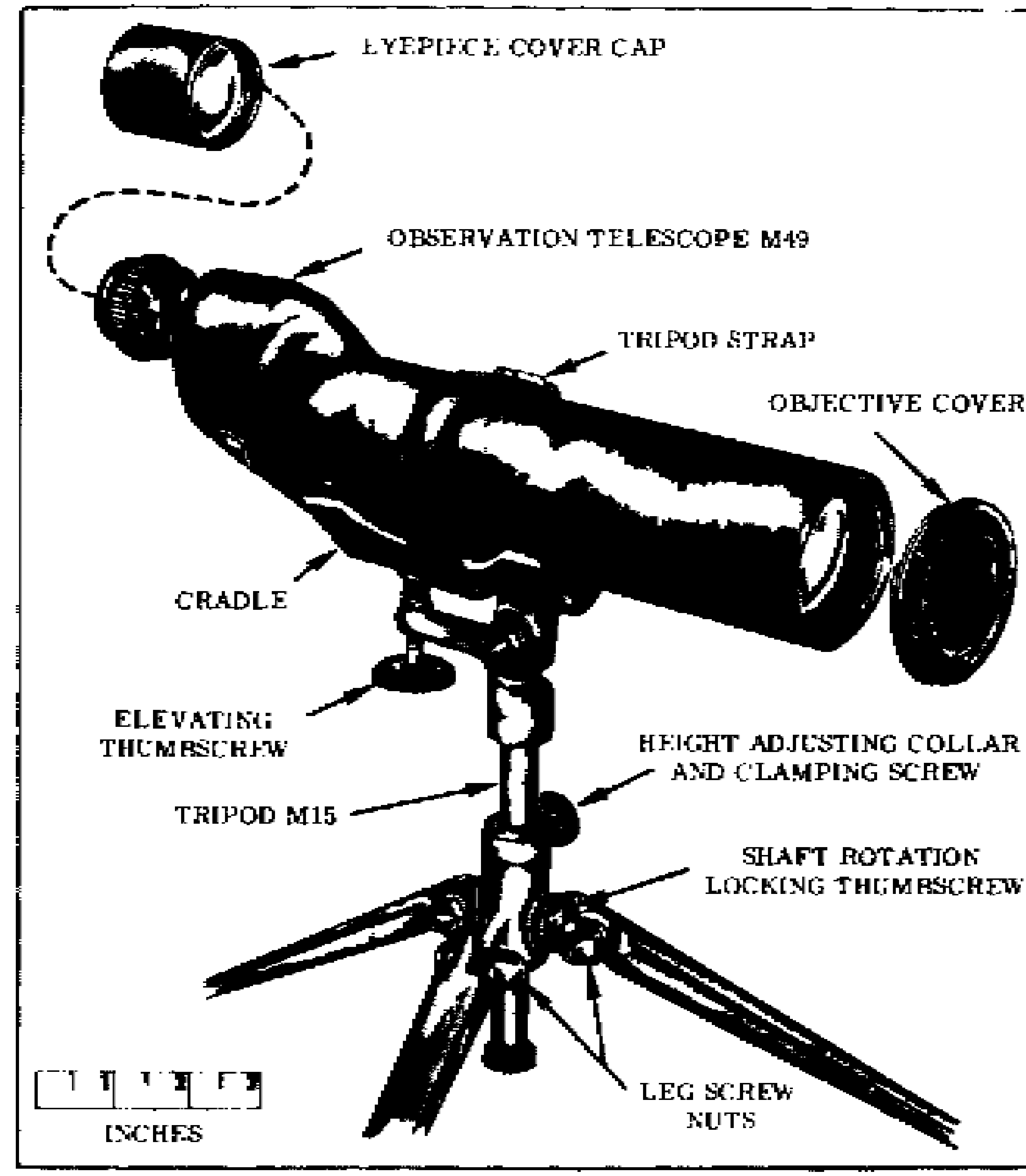


Figure 14.--M49 Observation Telescope With M15 Tripod.

CAUTION: CARE MUST BE TAKEN TO PREVENT CROSS-THREADING OF THE FINE THREADS.

c. Tripod M15

(1) The height adjusting collar is used

to maintain a desired height for the telescope. The collar is held in position by securely tightening the clamping screw.

(2) The shaft rotation locking thumbscrew clamps the tripod shaft at any desired azimuth.

(3) The elevating thumbscrew is used to adjust the cradle of the tripod, to increase or decrease the angle of elevation of the telescope.

(4) The tripod legs can be held in an adjusted position by tightening the screw nut at the upper end of each leg.

d. Setting Up. --With the tripod strap fastened to provide a loop 3 inches in diameter:

(1) Spread the legs and place the tripod on the ground. A level position should be sought to provide the cradle with a level line of sight with the target area.

(2) Place the telescope through the strip loop of the tripod and tighten the strap to prevent the telescope from rolling off the cradle and onto the ground. The scope is now prepared for use.

3303. BINOCULARS

a. General. --Each sniper team will be equipped with binoculars to aid in observing the enemy and in searching for and selecting targets. The binocular M17A1, 7x50, is currently the standard item of issue. It has seven-power magnification and a 50mm objective lens. Focal adjustments are on the eyepiece with separate adjustments for each eye. The left monocle has a horizontal and vertical scale pattern graduated in mils that is visible when the binocular is in use.

b. Nomenclature. --The nomenclature of the visible parts of the binoculars is shown in figure 15. Since disassembly is performed by optical repairmen only, the sniper will not be concerned with any other nomenclature.

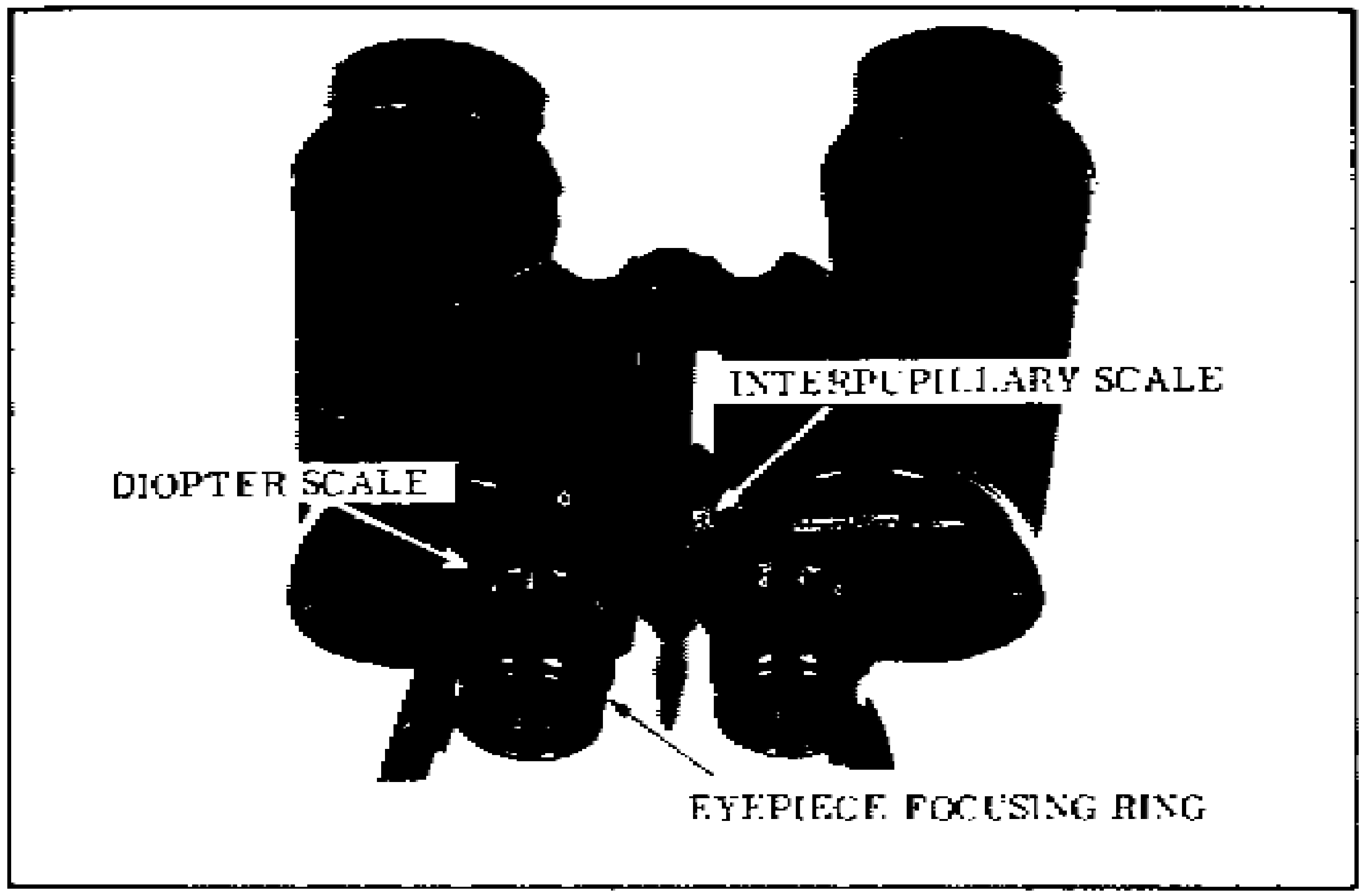


Figure 15. --Binoculars, M17A1, 7x50.

c. Method of Holding. --Binoculars are held as illustrated in figure 16. They should be held lightly, monocles resting on and supported by the heels of the hands. The thumbs block out light that

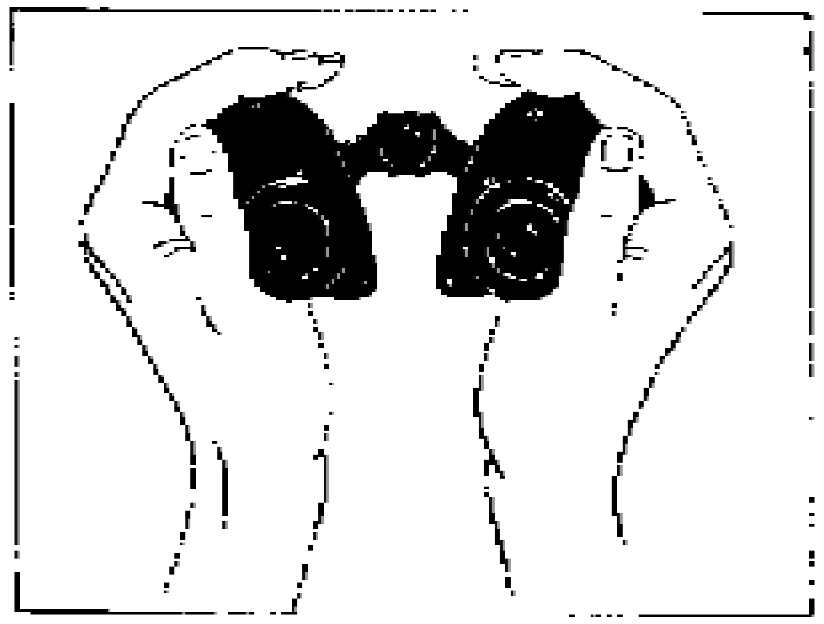


Figure 16. --Holding the Binoculars.

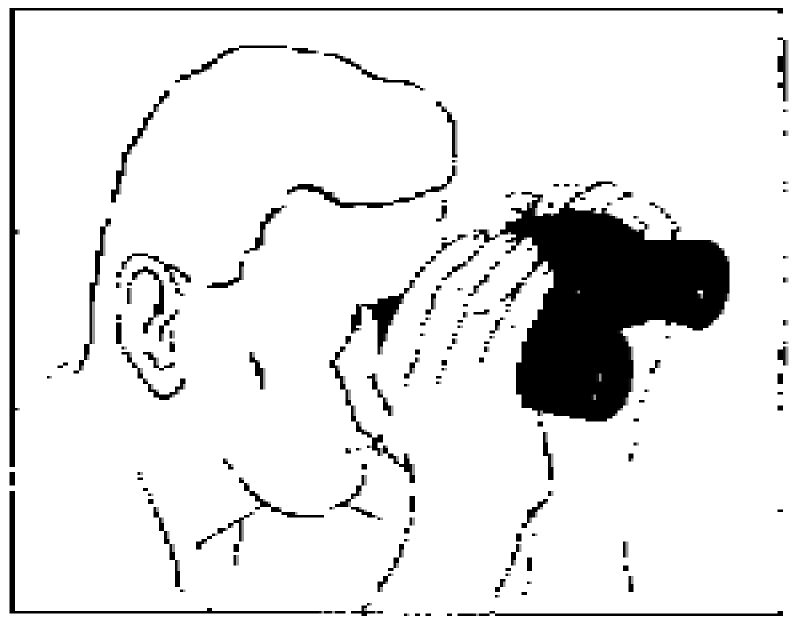


Figure 17. --Position of the Thumbs.

would enter between the eye and the eyepiece. (See fig. 17.) The eyepieces are held lightly to the eye to avoid transmission of body movement. Whenever possible, a stationary rest should support the elbows.

d. Adjustments

(1) Interpupillary Adjustment.--The interpupillary distance (distance between the eyes) varies with individuals. The two monocles that make up a pair of fieldglasses are hinged together so that the receptive lenses can be centered over the pupils of the eyes. Most binoculars have a scale on the hinge, allowing the sniper to preset the glasses for interpupillary distance. To determine this setting, the hinge is adjusted until the field of vision ceases to be two overlapping circles and appears as a single sharply defined circle. (See fig. 18.) Record the interpupillary setting for future use.

(2) Focal Adjustment.--Each individual and each eye of that individual requires different focus settings. Adjust the focus for each eye in the following manner:

(a) With both eyes open, look through the glasses at a distant object.

(b) Place one hand over the objective lens of the right monocle and turn the focusing ring of the left monocle until the object is sharply defined.

(c) Uncover the right monocle and cover the left one.

(d) Rotate the focusing ring of the right monocle until the object is sharply defined.

(e) Uncover the left monocle; the object should then be clear to both eyes.

(f) Read the diopter scale on each focusing ring and record for future reference.

e. Reticle.--The mil scale that is etched into the left lens of the binoculars is called the reticle pattern and is used in adjusting artillery

fire and measuring vertical distance in mils. Figure 19 shows the reticle pattern on the M17A1 binoculars.

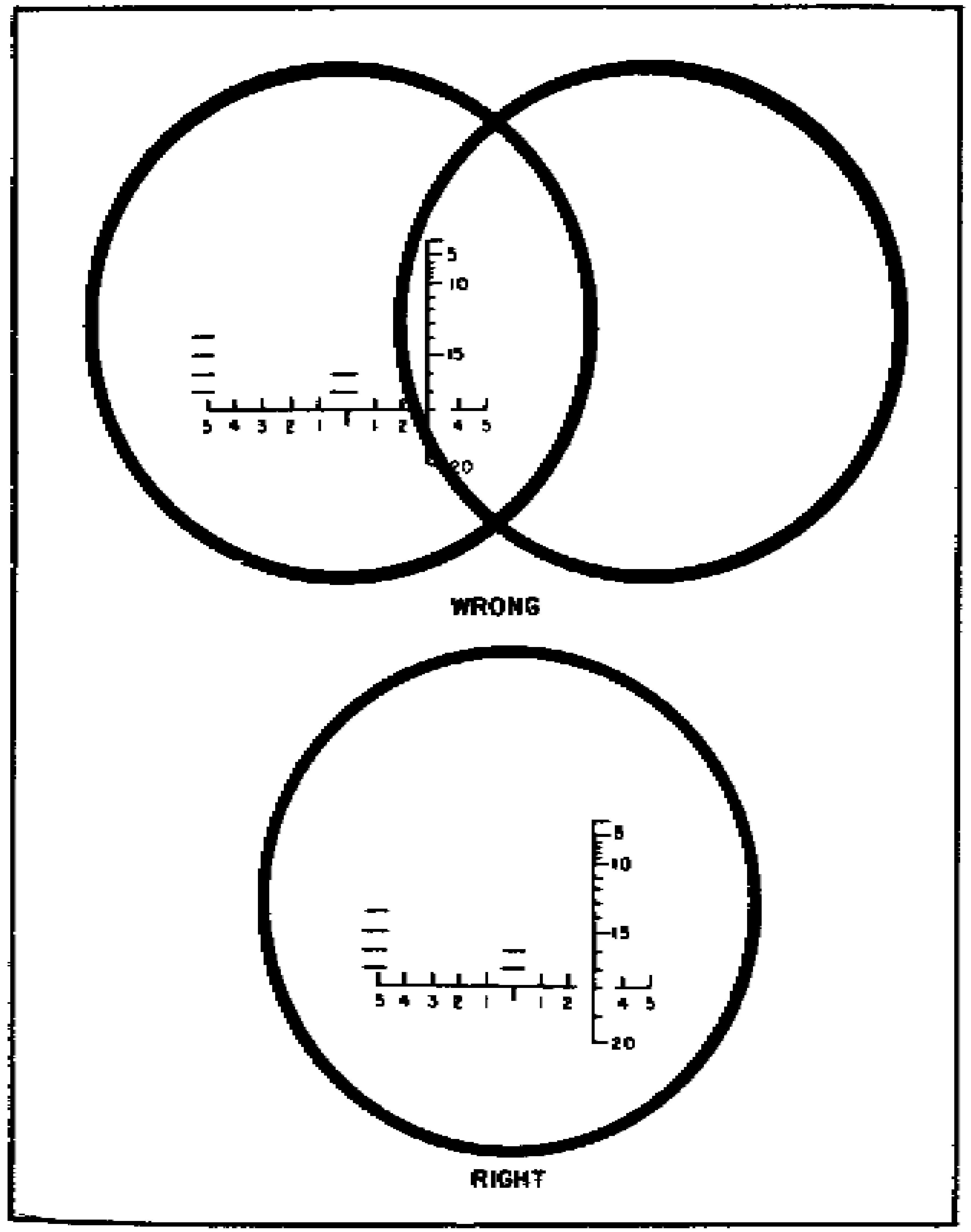


Figure 18.--Interpupillary Adjustment.

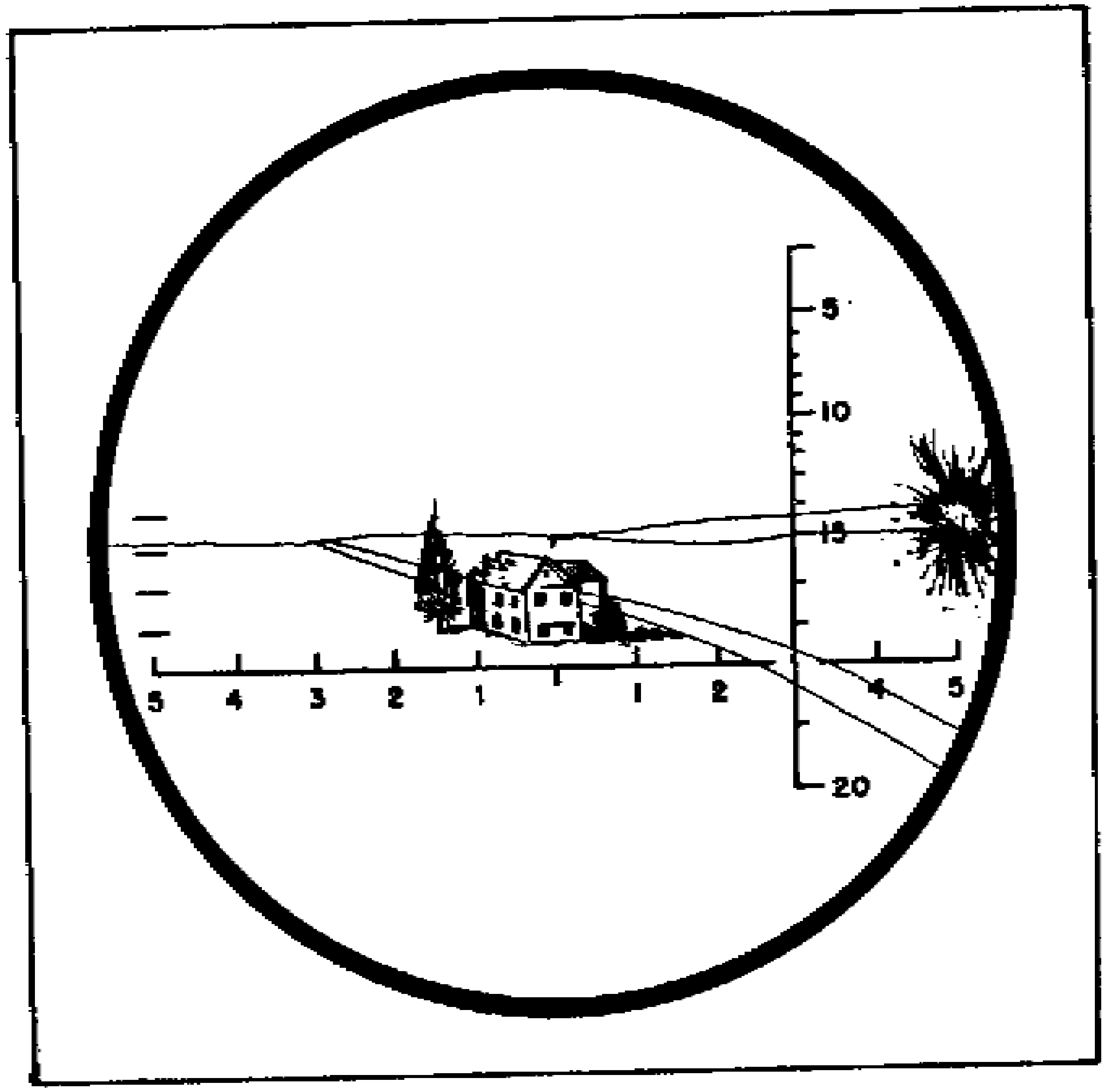


Figure 19.--M17A1 Reticle Pattern.

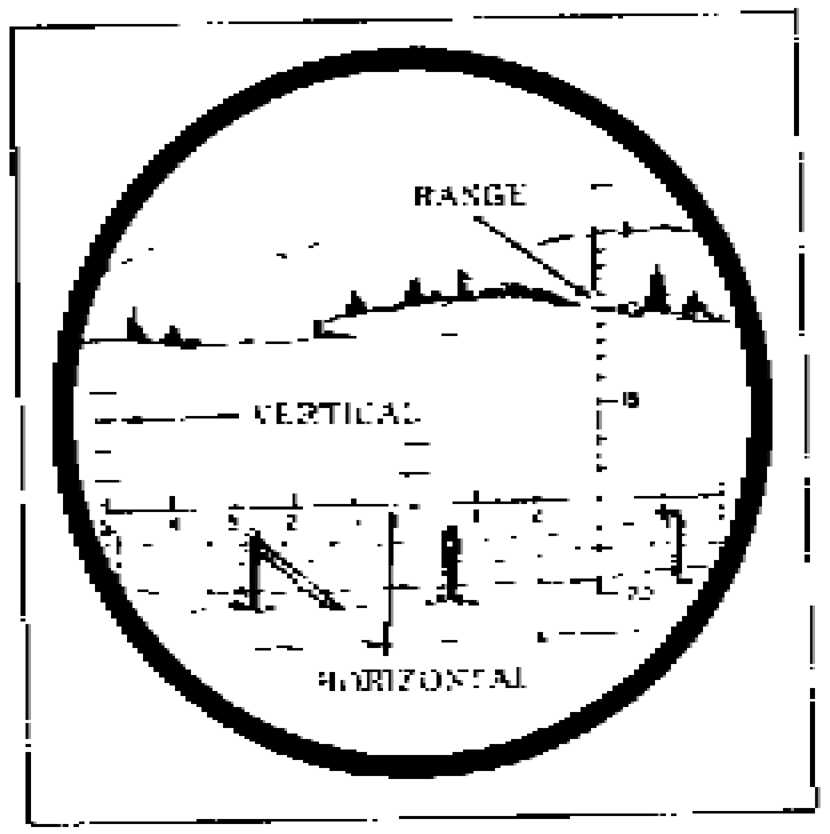


Figure 20.--M17A1 Reticle Pattern.

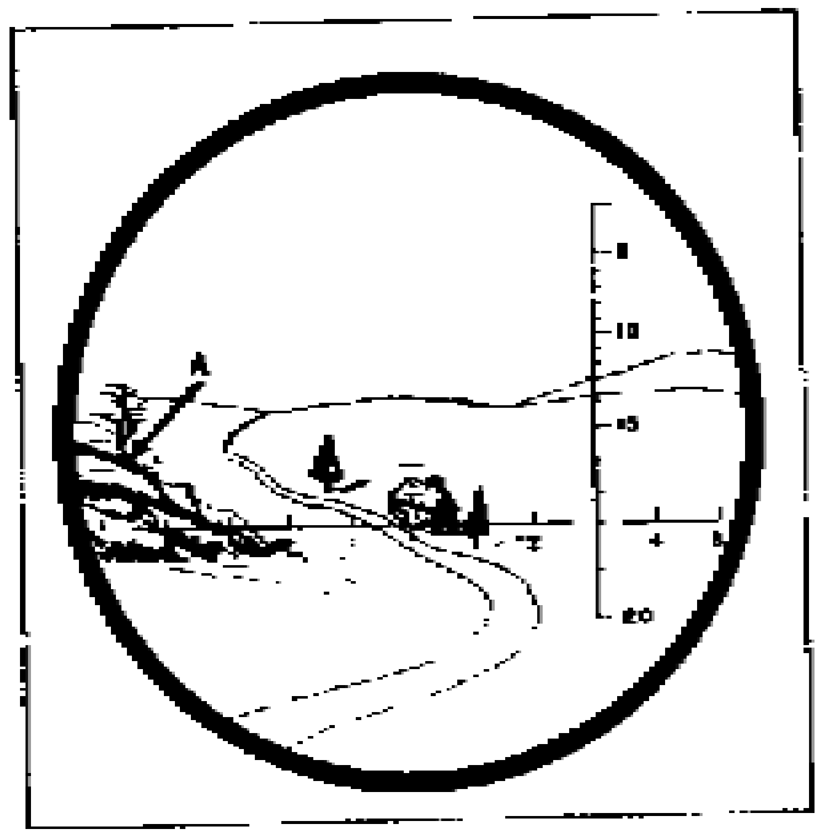


Figure 21.--Vertical Scales.

The horizontal scale is divided into 10-mil increments. The zero line is the short vertical line that projects below the horizontal scale between the two numbers "1." To measure the angle between two objects (such as a target and an artillery burst), center the target above the zero line. Then read the number which appears on the scale under the artillery burst. For example, in figure 19 the angle between the house and the shell burst is 50 mils. Vertical angles can be read on the vertical scale. There are two sets of mil scales, one above the zero on the horizontal scale, the other above the left horizontal 50-mil line on the horizontal scale. (See fig. 20.) The vertical scales are divided into increments of 5 mils each. Figure 21 shows how a vertical angle can be read. The vertical angle between the house and point A at the base of the tree is 10 mils. The third vertical scale is the range scale. It is used to estimate ranges from a known range but is not used by the sniper since he estimates his ranges by eye.

f. Additional Application.--In addition to observing and adjusting artillery and sniper fire, binoculars may be used to:

(1) Identify troops, equipment, weapons, vehicles, and aircraft.

(2) Observe enemy movement or positions.

(3) Locate targets.

(4) Make visual reconnaissance.

(5) Study terrain.

(6) Select routes and positions.

(7) Improve night vision.

g. Eye Fatigue.--Sniper team members must relieve one another in the task of observation since prolonged use of the binoculars or telescope will cause eye fatigue, materially reducing the effectiveness of observation. Periods of observation with optical devices should be limited to 30 minutes followed by a minimum of 15 minutes rest.

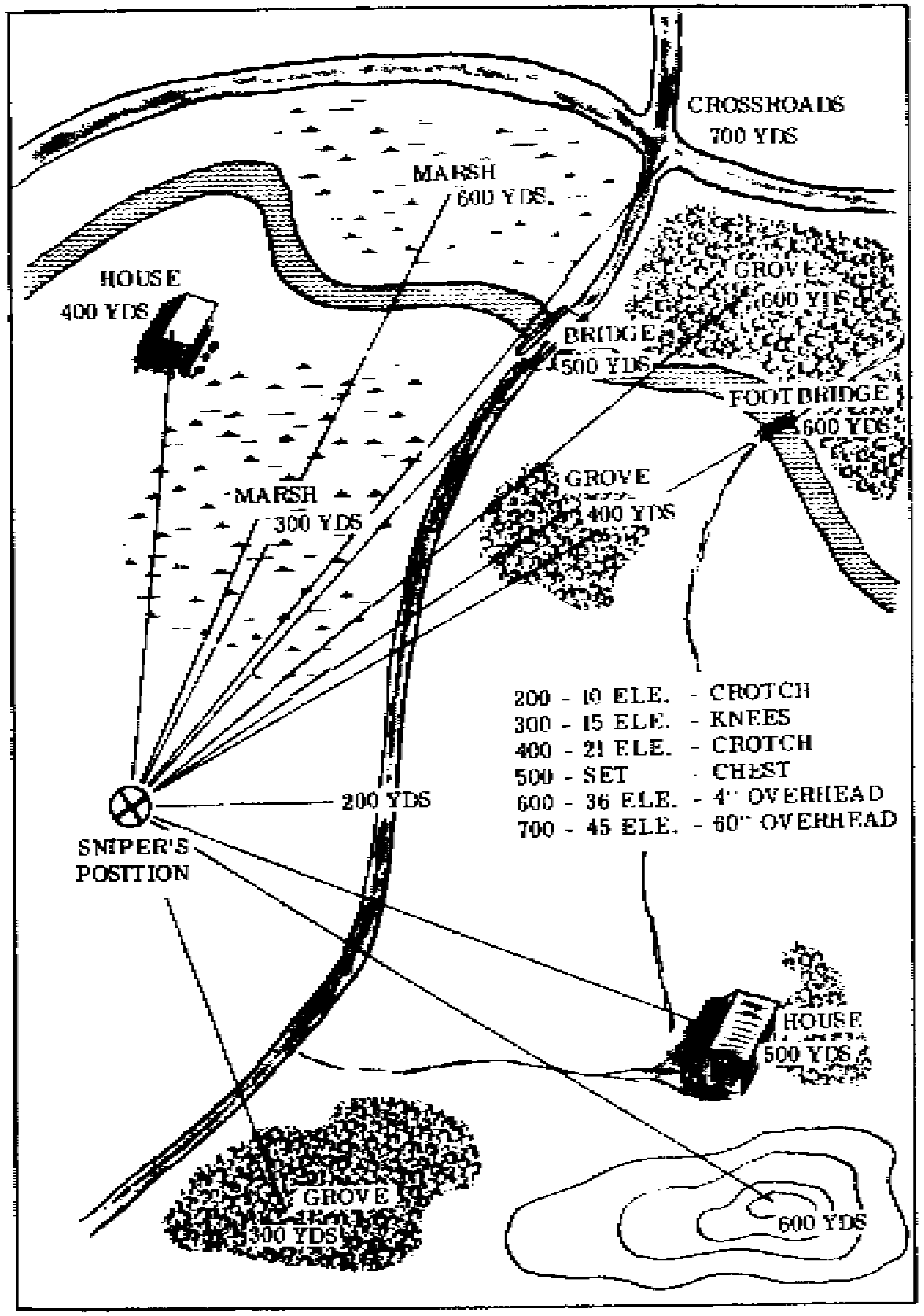


Figure 22. --Field Expedient Range Card.

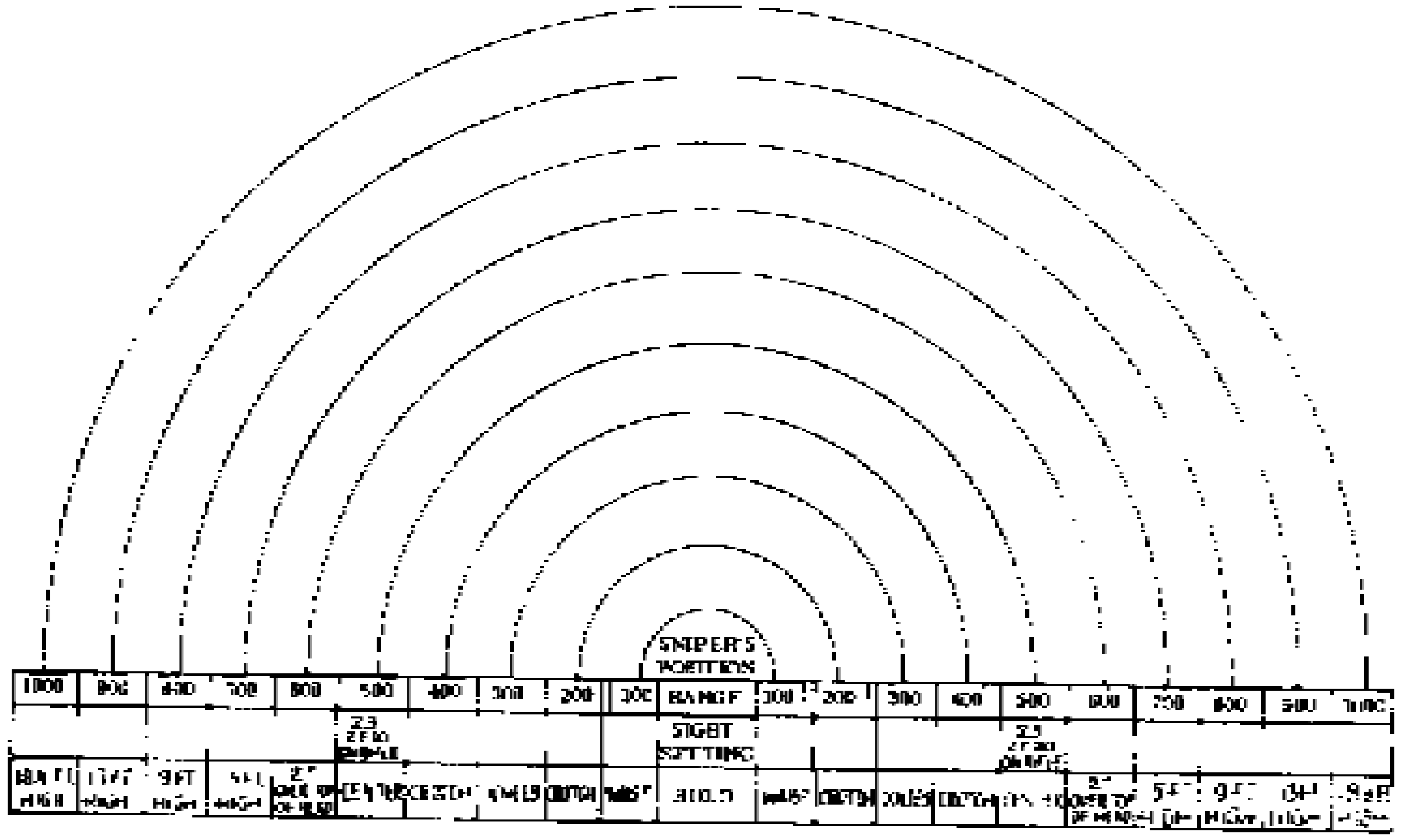


Figure 23. --Prepared Range Card.

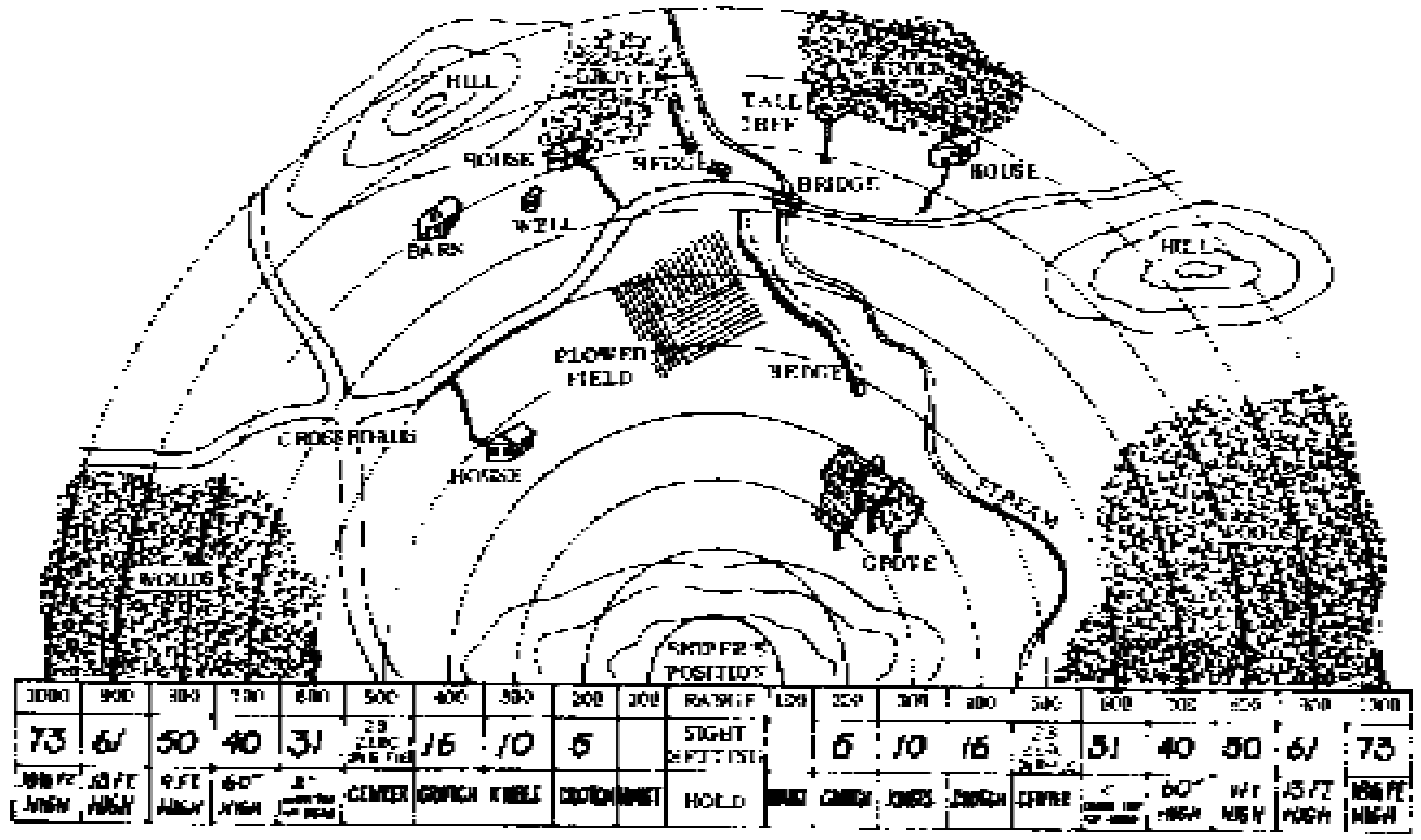


Figure 24. --Prepared Range Card Overlaid for Sniper's Position.

3304. RANGE CARD

The range card is a handy reference which the sniper uses to make rapid, accurate estimates of range to targets which he may locate in the course of his observations.

a. Field Expedient Card. --Figure 22 illustrates a range card which a sniper might have prepared after his arrival at a point of observation. The card was drawn freehand and contains the following information:

(1) Relative locations of dominating objects and terrain features.

(2) Carefully estimated, or map-measured, ranges to the objects and features.

(3) The sniper's sight setting and holds for each range.

b. Prepared Range Cards. --Prior to departure on a mission, the sniper may prepare a better range card in the form shown in figure 23. Upon arrival in position, he draws in the terrain features and the card might then appear as in the example of figure 24. To avoid preparing several cards for use in successive positions, the sniper can cover a single card with acetate and use a grease pencil to draw in the area features. NOTE: Figure 23 is considered an ideal range card and sniper readers are urged to reproduce it for use.

c. Use of the Range Card

(1) Holding. --The sniper locates a target in the doorway of the house at 10 o'clock from his position. From his card he quickly determines a range of 450 yards and a hold between center of mass and crotch. He centers the crosshairs just below the belt, fires, and hits the target in the solar plexus area.

(2) Sight Setting. --The sniper locates a target on the roof of the house at 1 o'clock. Quickly following the range curve from the house to the sight setting, he notes the setting 61, applies that setting, and fires.

Section IV. STARLIGHT SCOPE (AN/PVS-2)

3401. GENERAL

Snipers may be called upon to render precision fire support during periods of darkness. This section provides the information necessary to train snipers in the characteristics and techniques of employment of the Starlight Scope, a night vision sight.

a. Description. --The Starlight Scope **fig. 25.** (AN/PVS-2) is a portable, battery powered, electro-optical instrument that can be hand-held or mounted on individual weapons. The scope uses natural moonlight and/or starlight for target illumination. It detects distant and obscure objects at night by amplifying reflected ambient light to illuminate the objects to such a degree as to make them visible through the eyepiece. The Starlight Scope can be used for either passive visual observation or for aimed fire of weapons at night while the user remains free of enemy detection. See FMFM 1-3A, Field Firing Techniques, for a detailed description of the scope assembly.

b. Application. --The Starlight Scope is designed to be employed on the M14 and M16A1. Separate weapons adapter brackets are available for mounting the scope to each of these weapons. In addition, an adapter bracket is currently being developed for use with the rifle, caliber 7.62mm, M40.

3402. OPERATING PRECAUTIONS

The Starlight Scope, although designed to function under the most rugged conditions, is a precision electro-optical instrument and must be handled carefully. To prevent damage to the equipment and injury to himself, the sniper should

observe the following safety precautions:

a. Battery Disposal.--The contents of the mercury battery are highly irritable to the eyes and to oral and nasal tissues; therefore, caution must be exercised when handling the batteries. To prevent explosion, batteries should not be disposed of by burning, but should be buried or dumped into a large body of water.

b. Image Intensifier Tube.--Should the image intensifier tube be inadvertently exposed to intense light, it will automatically cut off to prevent burning out the tube and to protect the eye. However, continuous exposure of an activated tube to intense light should be avoided.

c. Daylight Operations.--During daylight operations, the lens cap must be positioned over the objective lens assembly. The Starlight Scope should never be aimed directly at the sun (image intensifier tube ON or OFF) since it will result in a complete failure of the tube.

d. Light Discipline at Night

(1) During Operation.--When operating the scope, care must be taken in the viewing procedure. If the rubber eyeshield is not positioned around the eye and against the face, visible light emitted from the eyepiece assembly will leak around the eyeshield and illuminate the sniper's face.

(2) After Operation.--After operation, the power switch is returned to the OFF position and the eyeshield removed from the eye.

e. Exposure to Rain.--After exposure to rain or high humidity, all parts of the scope must be thoroughly dried to prevent corrosion.

3403. WEAPONS ADAPTER BRACKETS

a. Installation

(1) M14 Rifle.--The weapon adapter bracket is aligned with the groove and screw recess

on the left side of the receiver. The bracket is secured to the receiver by tightening the socket head screw with an allen wrench.

(2) M16A1 Rifle.--The wingnut is unthreaded all the way to the thread-stops on the screw of the weapon adapter bracket. The tab is pulled away from the bracket and the mounting ear is pushed under the carrying handle of the rifle. The slotted groove is positioned in the base of the bracket over the top of the receiver group inside the opening of the carrying handle. The wingnut is firmly tightened until the tab is pulled tightly against the carrying handle and bracket. (See fig. 25.)

b. Mounting the Scope to the Bracket.--The lock knobs of the boresight mount assembly are rotated forward (towards objective lens) until they come to stop on the pins located on the assembly. The boresight mount assembly is moved onto the guide rail of the weapon adapter bracket from the rear until positioned against the pin stop of the

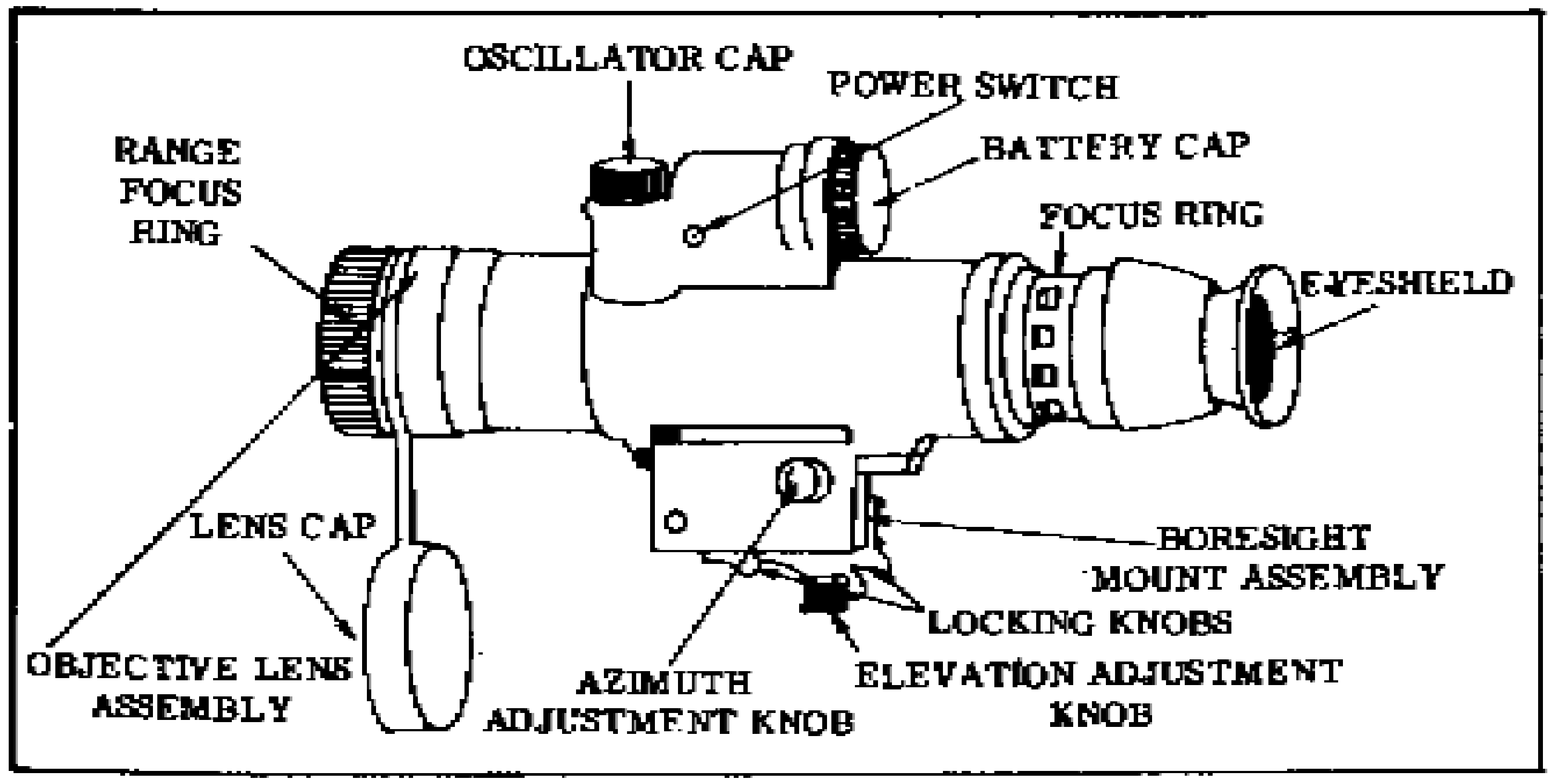


Figure 25.--Components of Starlight Scope (AN/PVS-2) Assembly.

guide rail. The Starlight Scope is then locked to the weapon adapter bracket by rotating the two locking knobs of the boresight mount assembly in a rearward direction.

3404. AIMING AND ZEROING

a. General. --Marksmanship training for the Starlight Scope must be considered as a continuation of fundamental marksmanship. If marksmanship fundamentals have been mastered, excellent results can be expected when employing the Starlight Scope. This paragraph sets forth procedures designed to develop skills in aiming and zeroing techniques so that the individual can effectively employ the Starlight Scope, to detect and place aimed fire on an enemy at night.

b. Aiming. --In aiming, the sniper is concerned with correctly pointing his weapon with a steady hold so that the projectile will hit the target when he fires. This basic fundamental applies equally when firing a rifle equipped with the Starlight Scope; however, there are special considerations regarding the sight picture and positions.

(1) Sight Picture. --Normally, the correct sight picture is obtained by having a proper alignment of the front and rear sights in relation to the target. Since the Starlight Scope is an optical instrument which does not require alignment of a front and rear sight, the sniper need only be concerned with the placement of the reference dot of the sight reticle in the center of mass of the target to obtain the correct sight picture.

(2) Positions. --Since the Starlight Scope increases the weight of the weapon 6 pounds, the importance of good firing position and steady hold technique cannot be overemphasized.

(a) Basic Positions. --The basic positions should be used; however, it will be

necessary to modify the position of the head to compensate for the offset of the Starlight Scope from the weapon.

(b) Firing Positions. --The Starlight Scope may be employed from any firing position; however, the positions best suited for operation are those that afford the greatest stability. Although all supported positions are suitable, the prone supported and foxhole supported are the most effective, especially when the scope is mounted on a weapon equipped with a bipod or tripod.

(c) Eye Position. --Because the Starlight Scope is offset to the left of the rifle, there is extreme difficulty maintaining a steady position when sighting with the right eye. It has been found practical to rest the cheek on the comb of the stock, as when sighting in with iron sights, and using the left eye to obtain the sight picture. This can be accomplished with only a minor adjustment in the position of the head. A slight change in zero may be encountered.

c. Zeroing Procedures. --The Starlight Scope may be zeroed during the hours of daylight, dawn and dusk, or darkness. When making adjustments for errors in elevation or azimuth, the sight must be moved in the direction of the error.

(1) Zeroing During Daylight. --The lens cap must be positioned over the objective lens during daylight operation. When zeroing in daylight, it may be necessary to cover one or two of the small pinholes in the lens cap to reduce the amount of light entering the Starlight Scope. When this becomes necessary, provisions should be made to permit the sniper to confirm his zero during the hours of darkness without the lens cap. This will ensure that the accuracy of the zero is maintained when one or more holes in the lens cap are covered and the cap is rotated on the objective lens.

(2) Zeroing During Dawn or Dusk. --Difficulty may also be experienced when attempting

to zero the Starlight Scope just prior to daylight (dawn) or just prior to darkness (dusk). The light level during these periods is too low to permit the image intensifier tube to resolve the zero target with the lens cap in place, yet it is intense enough to cause the intensifier tube to automatically cut off when the lens cap is removed from the objective lens.

(3) Zeroing the Scope to the M14 and M16A1 Rifles. --The recommended distance for zeroing the Starlight Scope is 150 meters. When zeroed at 150 meters, the bottom dot of the sight reticle is positioned in the center of mass of the target to engage targets at 300 meters. However, an accurate zero may also be obtained at either a closer or greater range. There are several methods of zeroing the Starlight Scope. They are:

(a) Stable Rest Zeroing. --This method of zeroing requires a minimum of ammunition; however, the accuracy of the zero is dependent on the stability of the rest. Zeroing is accomplished as follows:

1 Place or select a target at the desired range. Regardless of the zero range used, the sniper must know the rear sight setting of his weapon for that particular range.

2 Adjust the rear sight for that range.

3 Mount the Starlight Scope and place the weapon into the stable rest.

4 Sight through the rear sight of the weapon (not the Starlight Scope) and align the sight on the target.

5 Without disturbing the lay of the weapon and scope, sight through the scope. By manipulating the azimuth and elevation adjustment knobs, move the sight until the aiming reference dot is aligned on the same point of aim as the sights of the rifle.

6 When the aiming reference

dot in the scope and the rifle sights are aligned on the same point of aim on the zero target, the Starlight Scope and weapon are zeroed for that specific range. Situation permitting, the sniper should fire a few rounds to confirm the zero.

(b) 25-Meter Zeroing. --The principles of zeroing form a firm basis for teaching 25-meter zeroing of the Starlight Scope. Whether the 25-meter zero target is used or one produced by expediency, the center of the shot group must impact 1 inch below and 2 1/2 inches right of the bull's-eye to compensate for the mounted Starlight Scope being offset to the left. This establishes the zero for 150 meters. (See fig. 26.) The Starlight Scope is zeroed at 25 meters as follows:

1 With the scope mounted to the M14 or M16A1, the operator may select the position to be used; however, the supported positions are recommended for greater stability. The position selected must be located at the prescribed 25 meters (approximately 1,000 inches) from the target.

2 Sight through the Starlight Scope and position the aiming reference dot of the

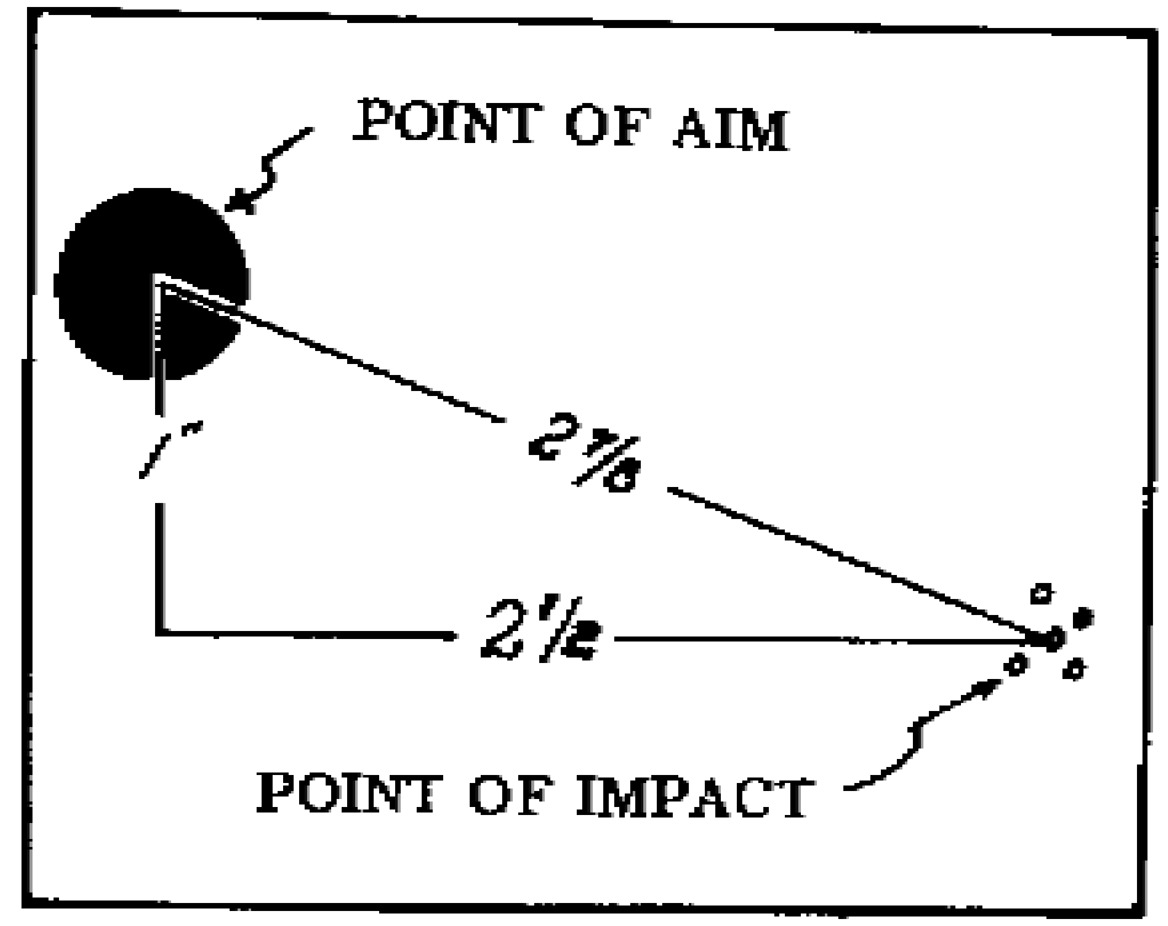


Figure 26. --25-Meter Zeroing With Starlight Scope.

sight reticle on the target. Fire a three-round shot group ensuring that the aiming reference dot is at the exact point of aim on the target each time a round is fired.

3 Analyze the target to determine the location of the center of the shot group in relation to the point of aim.

4 Adjust the sight by turning the elevation and/or azimuth adjustment knobs until the aiming reference dot is at the prescribed location. One click of the azimuth or elevation adjustment knob will move the strike of the bullet 1.27 centimeters (1/2 inch) at 25 meters. Adjustments are made in the direction of the error from where the center of the shot group should be. For example, if the center of the shot group is high and left of where it should be, the operator adjusts for this error by moving the sight up and to the left.

5 Because of the difference of shooters, weapons, or ammunition and the difficulty of obtaining a precise zero, sight settings obtained at 25 meters should be confirmed by firing on the actual range.

(c) Field Expedient Zeroing. --This method requires the use of an observer to assist in locating the strike of the bullet and to give the changes in elevation and deflection necessary to bring it to the point of aim. This method of zeroing is conducted as follows:

1 With the Starlight Scope mounted to his weapon, the sniper carries out operating instructions as described in preceding paragraphs.

2 The sniper and observer pick out a target that provides a definite point of aim and one that will aid in observing the strike of the bullet. This can be a brick building, a hillside, bank, or any dry surface.

3 Place the aiming reference dot at the point of aim and fire one round.

The observer estimates the distance between the strike of the bullet and the aiming point and gives the elevation and deflection change necessary to bring it to the point of aim. This distance is converted to clicks by dividing the error (in inches) by the number of inches one click will move the bullet at that range. For example, an operator fires one round at his zero target at a range of 150 meters. The observer estimates the strike of the round to be 2 feet above and 3 feet right of the aiming point. His correction would be: up eight clicks (24 inches at that range) and right 12 clicks (36 inches at that range). The sniper makes these adjustments and fires a confirming round.

4 The foregoing procedure is continued until the point of aim and the strike of the bullet coincide.

3405. EMPLOYMENT

a. General. --The Starlight Scope is designed for employment by the sniper on the M14 and M16A1 rifles. Separate weapons adapter brackets are available for mounting the Starlight Scope to the weapons listed above. Regardless of which weapon the scope is employed with, the procedures for mounting to the weapons adapter brackets are the same. Each weapons adapter bracket has an identical guide rail which mates with the boresight mount assembly of the Starlight Scope.

b. Considerations. --Although the function of the Starlight Scope is to provide an efficient viewing capability during the conduct of night combat operations, the Starlight Scope does not give the width, depth, or clarity of daylight vision. However, the individual can see well enough at night to aim and fire his weapon; to observe the effect of firing, the terrain, the enemy, and his own forces; and to perform numerous other tasks that confront a Marine in night combat. The Starlight Scope may

be used by snipers to:

(1) Assist sniper teams in deployment under cover of darkness to preselected positions.

(2) Assist sniper teams to move undetected to alternate positions.

(3) Locate and suppress hostile fire.

(4) Limit or deny the enemy movement at night.

(5) Counter enemy sniper fire.

(6) Demoralize the enemy with one-shot kills at night.

c. Factors Affecting Employment. --Consideration of the factors affecting employment and proper use of the Starlight Scope will permit more effective execution of night operations. The degree to which these factors aid or limit the operational capabilities of the Starlight Scope will vary depending on the light level, weather conditions, operator eye fatigue, and terrain over which the Starlight Scope is being employed.

(1) Light. --Since the Starlight Scope is designed to function using the ambient light of the night sky, the most effective operation can be expected under conditions of bright moonlight and starlight. As the ambient light level decreases, the viewing capabilities of the Starlight Scope diminish. When the sky is overcast and the ambient light level is low, the viewing capabilities of the Starlight Scope can be greatly increased by the use of flares or illuminating shells on the flanks or to the rear and by using visible light such as that produced by searchlights. When the Starlight Scope is employed with artificial illumination, the depth and clarity of vision is vastly superior to that experienced by the naked eye under similar light conditions. Infrared illumination may also be used to provide better viewing. Illumination may also be used to provide increased viewing capabilities under very low ambient light conditions.

(2) Weather Conditions. --Clear nights

provide the most favorable operating conditions in that sleet, snow, smoke, or fog affect the viewing capabilities of the Starlight Scope. Even so, the Starlight Scope can be expected to provide some degree of viewing capability in adverse weather conditions.

(3) Terrain. --To adequately describe the effects of terrain on the employment of the Starlight Scope, it is necessary to evaluate different types of terrain under varying ambient light conditions.

(a) When viewing from open terrain into densely wooded terrain, penetration of the wood line, even under the most favorable ambient light conditions, is limited to a few meters. The operator will experience difficulty in detecting targets against a very dark background.

(b) When viewing from open terrain into sparsely wooded terrain under moonlight and starlight conditions, penetration into woods is greatly improved depending on the depth of the woods, height and location of the moon, and the range.

(c) When viewing from sparsely or densely wooded terrain into open terrain under moonlight and starlight conditions, viewing capabilities are excellent. When operating under these conditions, the Starlight Scope should not be employed at a depth inside the woods that limits its field of view.

(d) When moving through densely wooded terrain under all ambient light conditions, viewing capabilities may be limited to a few meters.

(e) When moving through sparsely wooded terrain under moonlight conditions, viewing capabilities are good. As the ambient light level decreases down to and below starlight, effectiveness is decreased.

(f) When operating in dense or sparse woods, the sniper may experience difficulty

in depth perception due to the closeness of objects being viewed and the magnification of the objects by the Starlight Scope.

(g) Little difficulty should be experienced in following trails or roads under moonlight or starlight conditions.

(h) When operating in open terrain under moonlight and starlight conditions, viewing capabilities are limited only by the ambient light level and the range at which the Starlight Scope is capable of resolving a target.

(i) When using the Starlight Scope to view on or across rivers, streams, or lakes under moonlight and starlight conditions, the reflection of light off the water provides the maximum viewing capabilities.

(4) Eye Fatigue. --Most operators will initially experience eye fatigue after 5 or 10 minutes of continuous observation through the Starlight Scope. With practice, he should be able to observe for longer periods of time. To aid in maintaining a continued viewing capability and lessen eye fatigue, the operator may alternate eyes during the viewing period.

3406. MAINTENANCE AND REPAIR

a. General. --The sniper need be concerned only with information necessary for the proper maintenance of the Starlight Scope. This will include care and cleaning and preventive maintenance to include minor corrective action.

b. Care and Cleaning

(1) Inspection. --To ensure that the scope is ready for operation at all times, inspect it systematically to discover and correct defects before serious damage or failure results. Note defects during operation and ensure appropriate corrective action is taken upon completion of operation. All defects, deficiencies, and corrective

action taken will be recorded on DA Form 2404 at the earliest opportunity.

(2) Special Instructions

(a) Clean exposed glass surfaces of the objective lens and eyepiece by removing loose dirt with the lens brush provided. Clean the glass surfaces with lens tissue. Dampen lens tissue with water if necessary (distilled water if available).

(b) Clean all exposed metal surfaces on the Starlight Scope and low-temperature adapter assembly with a cloth. Dampen cloth if necessary.

(c) No lubricating materials are required by the operator for maintenance of the Starlight Scope.

c. Daily Preventive Maintenance. --The sniper must perform the following daily preventive maintenance services:

(1) Inspect and service main housing of Starlight Scope for dents, cracks, and loose or missing parts. Tighten loose parts. Report missing parts or damaged main housing to organizational maintenance.

(2) Inspect and service objective and focal lenses for dirt, dust, cracks, scratches, and signs of fogginess or moisture. If lenses are scratched, cracked, or fogginess or moisture appear within either lens assembly, report condition to organizational maintenance.

(3) Inspect range focus ring for dirt, free operation, or damage. Clean the focus ring. Report faulty operation of focus ring or range focus ring to organizational maintenance.

(4) Inspect the azimuth and elevation adjustment knobs for dirt, damage, and freedom of operation. Clean dirty knobs. Report faulty operation to organizational maintenance.

(5) Remove battery cap from battery housing and inspect for dirt, cracks, dents, and damaged battery spring or O-ring. Replace

damaged battery cap, spring, or O-ring. Inspect battery for corrosion, leaks, and other damage. Install new battery, if necessary, and reassemble battery cap.

(6) Inspect exterior of oscillator cap for dirt, cracks, and dents. DO NOT remove oscillator cap from oscillator housing. Clean outside surfaces only. Report damaged oscillator cap to organizational maintenance.

(7) Although the operator is not authorized to remove the oscillator cap, it is possible to check the functioning of the oscillator. Move the control switch to the ON position and listen for operating hum which is audible if oscillator is working. If operating hum cannot be heard, report condition to organizational maintenance.

(8) With control switch in the ON position, look into the eyepiece and inspect for operation of the image intensifier tube. DO NOT ATTEMPT REMOVAL OF THE IMAGE TUBE FROM THE MAIN HOUSING. Return control switch to the OFF position. Report all failures or malfunctions of image tube to organizational maintenance.

(9) Inspect boresight mount assembly for cracks, breaks, dents, dirt, and operability of locking knobs. Service and replace as required.

(10) Inspect rubber eyeshield for dirt, oil cracks, flexibility, and other damage. Remove eyeshield if dirty or damaged. Clean with a clean wet cloth. Replace damaged eyeshield and assemble new eyeshield onto eyepiece assembly.

(11) Ensuring the control switch is in the OFF position, remove the lens cap and inspect for dirt, obstructed holes, cracks, or other damage. Clean with wet cloth and reassemble to objective lens assembly. Replace damaged lens cap and reassemble.

3407. DESTRUCTION

a. General. --When it is liable to capture

or abandonment in a combat zone, the Starlight Scope and related material should be destroyed by the sniper according to the unit's established policy. IF AT ALL POSSIBLE, THE STARLIGHT SCOPE SHOULD BE EVACUATED. When evacuation is not possible, destruction should be as complete as possible, with the most important parts being destroyed first. The same essential parts are destroyed or evacuated by all units to prevent the enemy from constructing a complete unit from several abandoned items. Personnel will be trained in the prescribed methods of destruction.

b. Methods

(1) Burning. --Stand the Starlight Scope on end, preferably in a hole, with the objective lens up. Position a thermite grenade on the objective lens and pull the pin. Ensure that the grenade has destroyed the optics, oscillator, and imager intensifier tube.

(2) Weapons Fire. --Place the Starlight Scope on end, preferably in a hole, with the objective lens up. Fire one or more rounds into the Starlight Scope through the objective lens. Ensure that the round(s) penetrate(s) the objective lens, reticle lens, oscillator, image intensifier tube, and eyepiece assembly.

(3) Evacuation of Parts. --If parts are to be evacuated, the assemblies retained should be the image intensifier tube and the oscillator. The remainder of the scope should be destroyed as completely as possible.

Section V. CARE AND CLEANING

3501. GENERAL

The sniper candidate, already an expert marksman, will be well aware of the benefits of keeping his equipment in a state of perfect repair and cleanliness. Nevertheless, his sniper training program must include a review of basic maintenance procedures and must stress the maintenance requirements for the special conditions he will encounter aboard ship, in weather extremes, and in combat. Additionally, he must be taught the methods for cleaning and safeguarding his sniper optical equipment.

3502. RIFLE MAINTENANCE

Rifle maintenance is any measure taken to keep the weapon in top operating condition. It includes inspection, repair, cleaning, and lubrication.

a. Inspection.--Inspection reveals the need for repair, cleaning, or lubrication. A weapon, sheltered in garrison and infrequently used, must be inspected often to detect dirt, moisture, and signs of corrosion, and it must be cleaned accordingly. A weapon in use and subject to the elements, however, requires no inspection for cleanliness since the fact of its use and exposure is sufficient evidence that it requires repeated cleaning and lubrication. The sniper couples his daily cleaning chores, however, with a program of minute inspection for damage or defect.

b. Repair.--The sniper, himself, can accomplish only the most superficial repair tasks, such as screw tightening or replacement. He has no disassembly authority (except that he may strip the bolt to clean and lubricate it), nor does he have a required variety of tools or parts. Field repair

of the rifle is the responsibility of the rifle team equipment repairman.

c. Cleaning the Rifle

(1) Tools and Material

(a) Cleaning patches.

(b) Dry cloths.

(c) Bore cleaner fluid is used for cleaning both bore and chamber. It also temporarily inhibits rust.

(d) Hot soapy water or plain hot water is a poor substitute for bore cleaner fluid but should be used when bore cleaner is not available.

(e) A cleaning rod is used in cleaning the bore and chamber. Soft metal rods of brass or aluminum are superior to hard steel rods, which may cause excessive wear on the lands, especially at the muzzle.

(f) Bore brushes (.30 and .45 caliber).

(g) Soft bristle paint brush.

(h) Stiff or brass bristle scrub brush.

(2) When to Clean the Rifle

(a) Before Firing.--The rifle must always be cleaned prior to firing. Firing a weapon with a dirty bore or chamber will multiply and speed up any corrosive action which may have begun. Oil in the bore and chamber of even a clean rifle will cause pressures to vary and first-round accuracy will be lost. In combat, the sniper will clean and dry the bore and chamber prior to departure on a mission and will be extremely careful to keep his rifle clean and dry en route to his objective area. Firing a rifle with oil or moisture in the bore will cause a puff of smoke that can disclose the sniper's position.

(b) After Firing.--The rifle must be cleaned after it has been fired because firing produces deposits of primer fouling, powder

ashes, carbon, and metal fouling. Although modern ammunition has a noncorrosive primer which makes cleaning easier, the primer still leaves a deposit which may collect moisture and promote rust if not removed. The rifle must be cleaned within a reasonable interval--a matter of hours--after cessation of firing. Common sense should preclude the question as to the need for cleaning between rounds. Repeated firing will not injure the weapon IF IT WAS PROPERLY CLEANED BEFORE THE FIRST ROUND. After a rifle has been fired, it must be cleaned daily for at least three consecutive days. For several days after that, it must continue to be checked for fouling by running a clean patch through the bore.

(c) In Cold Climate.--In temperatures below freezing, the rifle must be kept free of moisture and heavy oil, both of which will freeze and, in turn, cause working parts to freeze or to operate sluggishly. If the rifle is taken into a warm room, it must be cleaned and dried as soon as it reaches room temperature and condensation has occurred.

(d) In Hot, Humid Climate.--In this climate, the rifle must be cleaned at least daily to protect it from moisture and ensuing rust.

(e) Salt Water Exposure.--Salt water and salt water atmosphere have extreme and very rapid corrosive effects on metal. During periods of this exposure, the rifle cleaning chores cannot be overemphasized.

(3) Cleaning Procedures

(a) Bore.--Remove the bolt. Insert a cleaning patch into the cleaning rod and dampen the patch with bore cleaner fluid. Run the rod several times back and forth through the bore FROM THE CHAMBER. Remove the rod tip, attach the .30 caliber bore brush, and run it back and forth two or three times. Follow by more wet patches and a succession of dry patches. The bore

will be clean when a patch comes out still dry and clean. CAUTION: Push the patches and the brush all the way through the bore before beginning their withdrawal but do not allow the rod to rub against the bore at the muzzle. When pushing the cleaning rod through the bore of the M40 rifle, extreme caution should be taken to prevent the cleaning rod handle from striking the eyepiece lens.

(b) Chamber.--Attach the .45 caliber brush to the rod and rotate it into the chamber until the chamber is clean. Withdraw the brush by continuing the rotation with a backward pressure. If a brush is not available, use two patches, wet with cleaner, in the patch holder of the rod. Dry the chamber using pairs of dry patches until a pair comes out clean and dry.

(c) Bolt.--Scrub the face of the bolt with the brass or stiff bristle brush. Remove the grease, oil, and dirt from the bolt with a clean, dry cloth.

(d) Other Parts.--Other parts of the rifle are cleaned by using a stiff bristle brush to remove the grease, oil, and dirt. Use the soft hair paint brush to dust out recesses and to remove lint.

d. Lubricating the Rifle

(1) Lubricants

(a) Lubricating Oil, Semifluid.--Used at normal and low temperatures for protecting metal from rust.

(b) Medium Preservative Oil.--Used in high temperatures and humidity and in salt water areas.

(c) Lubricating Oil, Weapon (LAW).--Used in freezing temperatures.

(d) OE10 Engine Oil.--Used when prescribed oils are not available. Not a par substitute. Authorized lubricants should be obtained as soon as possible.

(e) Rifle Grease.--Used on rifle

bolt areas of heavy wear.

(f) Raw Linseed Oil. --Not used essentially as a lubricant but as a stock preservative.

(2) Oiling the Rifle

(a) Bore and Chamber. --After each cleaning, the bore and chamber should receive a light coat of oil appropriate to the climate.

(b) Bolt. --After each cleaning, the bolt should be lightly oiled. Prior to firing, the bolt should be lightly greased at all points of wear except in freezing temperatures when it should be dampened with LAW.

(c) Cold Climate. --In freezing temperatures, oil is applied very sparingly.

(d) Hot, Humid Climate and Salt Air. --Under these conditions, preservative oil is applied frequently to the metal parts of the rifle. Oiling must not be used as a substitute for cleaning the weapon. Oil applied over moisture will rub off and moisture will remain to corrode the metal. Dry the weapon well before lubricating.

(e) Stock. --If left untreated, the wooden rifle stock will absorb moisture which will swell and warp the stock, leaving the weapon unserviceable. Linseed oil, a drying agent, by virtue of its oxygen absorbing property, will safeguard the stock from moisture in even the most humid climates. It must be freely used and rubbed well into the stock as a part of every cleaning. If the application of linseed oil proves ineffective, the rifle team equipment (RTE) repairman can glassbed and waterproof the stock."

3503. CARE OF OPTICAL EQUIPMENT

a. General. --Dirt, rough handling, or abuse of optical equipment will result in inaccuracy and malfunction. When not in use, the

equipment should be cased and the lenses should be capped.

b. Cleaning the Lens. --Some lenses are coated with magnesium fluoride for improved light transmission. The coat is a very thin film and great care is required to prevent damage to it.

(1) To remove dust, lint, or other foreign matter from the lens, brush it lightly with a clean camel's hair brush.

(2) To remove oil or grease from optical surfaces, breathe heavily on the glass and clean it with lens tissue. In field use, where tissue may not be available, a soft clean cloth may be substituted.

c. Operation in Cold Climate. --In extreme cold, care must be taken to avoid condensation and the congealing of oil on the glasses.

(1) Condensation. --If not excessive, condensation can be removed by placing the instrument in a warm place. Concentrated heat must not be applied for it will cause expansion and damage. Moisture may also be blotted from the optics with soft dry cloths.

(2) Oil. --In cold temperatures, oil will congeal and cause sluggish operation or failure. Focusing parts are particularly sensitive to congealing oils. Breathing will form frost, so the optical surfaces must be cleaned with lens tissue, preferably dampened lightly with alcohol. Do not, however, apply the alcohol directly to the glass.

d. Operation in Hot Climate and Salt Water Atmosphere. --Optics are especially vulnerable to hot, humid climates and salt water atmosphere.

(1) Sun Rays. --Optical equipment must not be exposed to direct sunlight in a hot climate. Irrepairable damage will result due to the variation in the expansion rates of the equipment parts.

(2) Humidity and Salt Air. --In these

environments, the optical instruments must be inspected and cleaned very frequently to avoid rust and corrosion. A light film of oil is beneficial.

(3) Perspiration.--Perspiration from the hands is a contributing factor to rust. After being handled, instruments must be thoroughly dried and lightly oiled.

e. Handling Telescopes.--Telescopes are delicate instruments and must be handled with care. The following precautions will prevent damage:

(1) Check and tighten all mounting screws periodically and always prior to leaving on an operation.

(2) Keep lenses free from oil and grease and never touch them with the fingers because body grease and perspiration injure them.

(3) Do not force elevation and windage screws or knobs.

(4) Do not allow the telescope to remain in direct sunlight, and avoid letting the sun's rays shine on the lens. Direct sun rays and excessive heat damage the lens elements. Lenses magnify and concentrate sunlight into a pinpoint of intense heat (as in a laser beam) which is focused on the range scale. This will melt the scale and damage the telescope internally. Keep the lens cover on and the scope covered when not in use.

(5) Avoid dropping the scope or striking it with another object. When not in use, lenses should be covered with caps.



CHAPTER 4

MARKSMANSHIP TRAINING

Section I. GENERAL

4101. PURPOSE

The purpose of sniper marksmanship training is to teach the sniper the principles and techniques of precision shooting with special sniper equipment.

4102. FUNDAMENTALS

Rifle marksmanship fundamentals are those relatively constant factors which must be practiced in order for a shooter to hit a target. Essentially, he must be able to assume a correct firing position, to hold or rest his rifle as if he and the rifle were a single unit, to correctly align his sights on the target, and finally, to fire

without disturbing the alignment.

a. Review of Fundamentals.--An absolute prerequisite to sniper training is that the candidate be an expert marksman. As such, he will have exhibited an apparent mastery of fundamentals. Nevertheless, before he advances to a study of the principles and techniques of precision sniper shooting, he must receive a thorough progressive review of fundamentals in order to reinforce his knowledge and to eliminate any developed faults.

b. Progressive Training.--An effective training in fundamentals can be provided by a six-step program involving the following sequence of instruction:

(1) Sighting and aiming (instruction in the proper relationship of the eye, rifle sights, and target).

(2) Positions (proper application of all positions used by the sniper).

(3) Trigger control (the act of firing the rifle without disturbing the aim).

(4) Sight adjustment (the proper manipulation of the sights to regulate the strike of the bullet).

(5) Weather effects (an explanation of how weather conditions affect the sniper and the bullet and of how to compensate for those conditions).

(6) Zeroing (the adjustment of the sights to hit a given point at a given range).

c. Safety and Care of Equipment.--Personal safety and care of equipment are subjects of special importance and should be taught concurrently throughout the training cycle. (See app. A and chap. 3, sec. V.)

Section II. SIGHTING AND AIMING

4201. GENERAL

The arrangement of an optical sight allows aiming without recourse to the organic rifle sights. The line of sight is the optical axis that runs through the center of the lens and the intersection of the crosshairs. The role of the front sight in a telescope is fulfilled by the crosshairs. The crosshairs and the image of the observed object



Figure 27.--Quartering the Target.

(target) are in the focal plane of the lens (that plane which passes through the lens focus perpendicular to the optical axis). The sniper's eye perceives the crosshairs and the image of the target with identical sharpness. In order to aim by means of a telescope, the sniper's head must be positioned at the exit pupil of the telescope eyepiece, so that the line of sight of his eye coincides with the optical axis of the telescope. He then centers the crosshairs on the target. (See fig. 27.) Figure 28 shows the proper relationship between the crosshairs and various targets.

4202. EYE RELIEF

In aiming, the eye must be located 2-3 inches from the exit pupil of the eyepiece. (See fig. 29.) This distance--the eye relief--is fairly large, but is necessary to ensure safety from recoil.

a. Shadow Effects.--During aiming, the sniper must ensure that there are no shadows in the field of vision of the telescope; it must be completely clear. If the sniper's eye is located without proper eye relief, a circular shadow will occur in the field of vision, reducing the field size, hindering observation, and in general, making aiming difficult. If the eye is positioned incorrectly in relation to the main optical axis of the telescope, that is, shifted to the side, crescent-shaped shadows will occur on the edges of the eyepiece; they can occur on either side, depending upon the position of the axis of the eye with respect to the optical axis of the telescope. If these crescent-shaped shadows are present, the bullets will strike to the side away from them. (See fig. 30.)

b. Head Adjustment.--If the sniper notices shadows on the edges of the field of vision during aiming, he must find a head position in

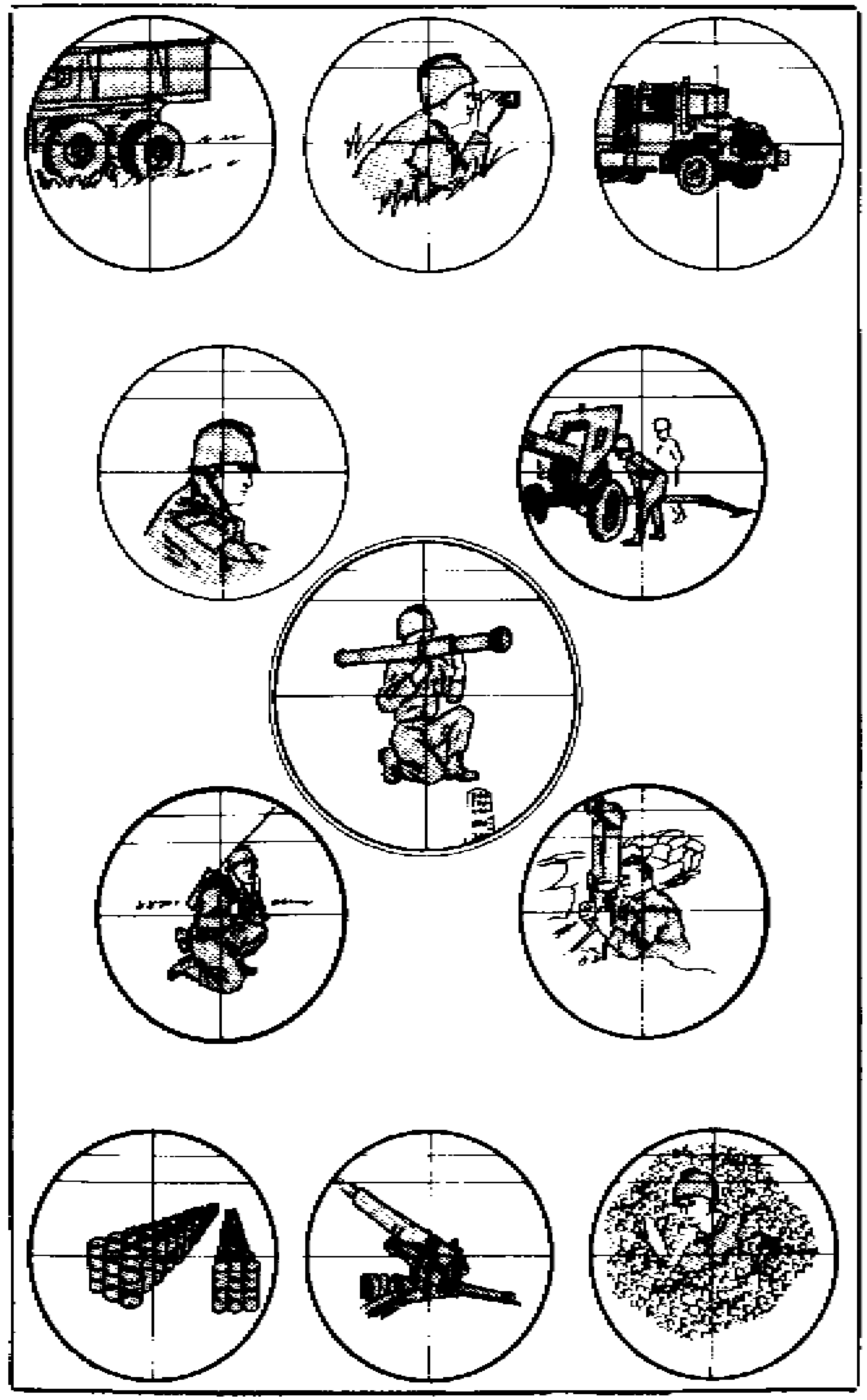


Figure 28.--Sample Sight Pictures.

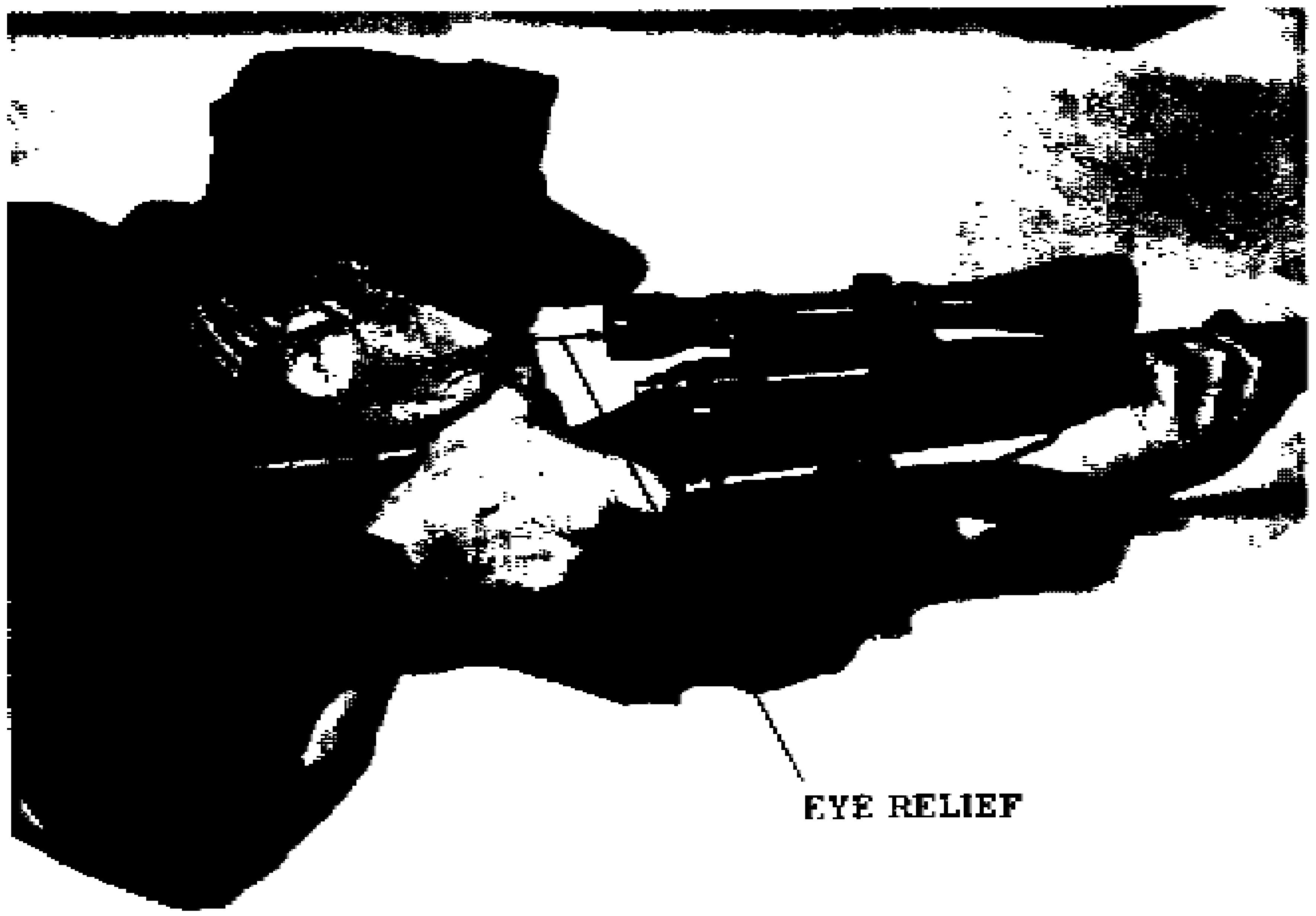


Figure 29. --Eye Relief.

which the eye will see clearly the entire field of vision of the telescope. Consequently, in order to ensure accurate aiming with the aid of a telescope, the sniper must direct his entire attention to keeping his eye on the optical axis of the telescope and to have the intersection of the crosshairs coincide exactly with the aiming point.

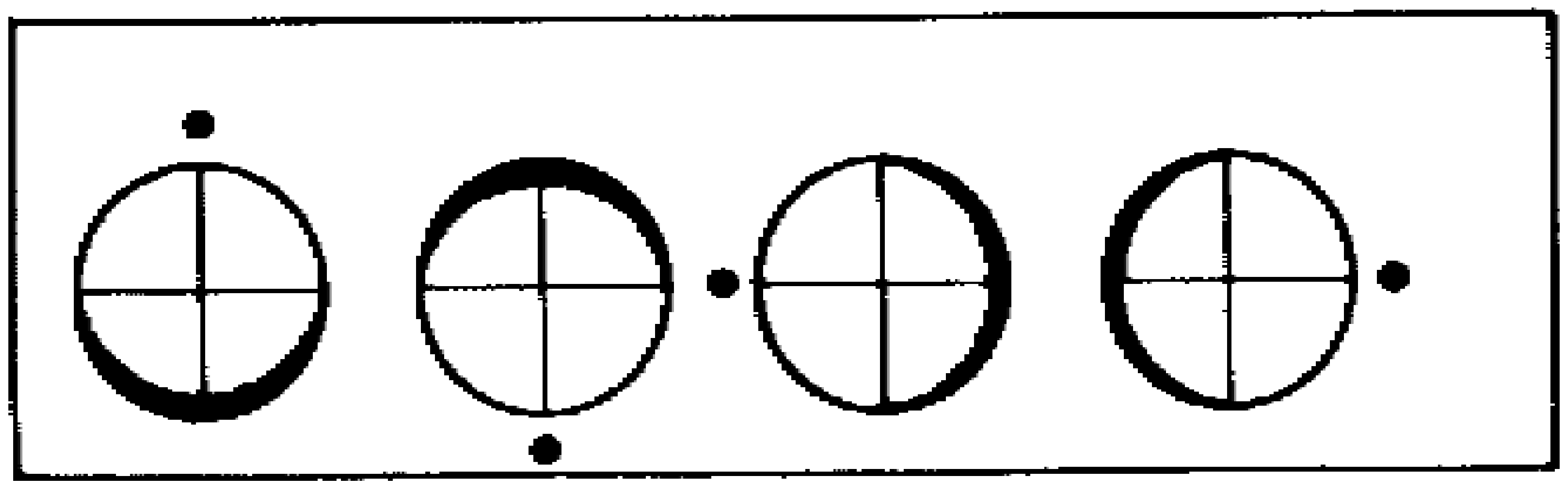


Figure 30. --Shadow Effects.

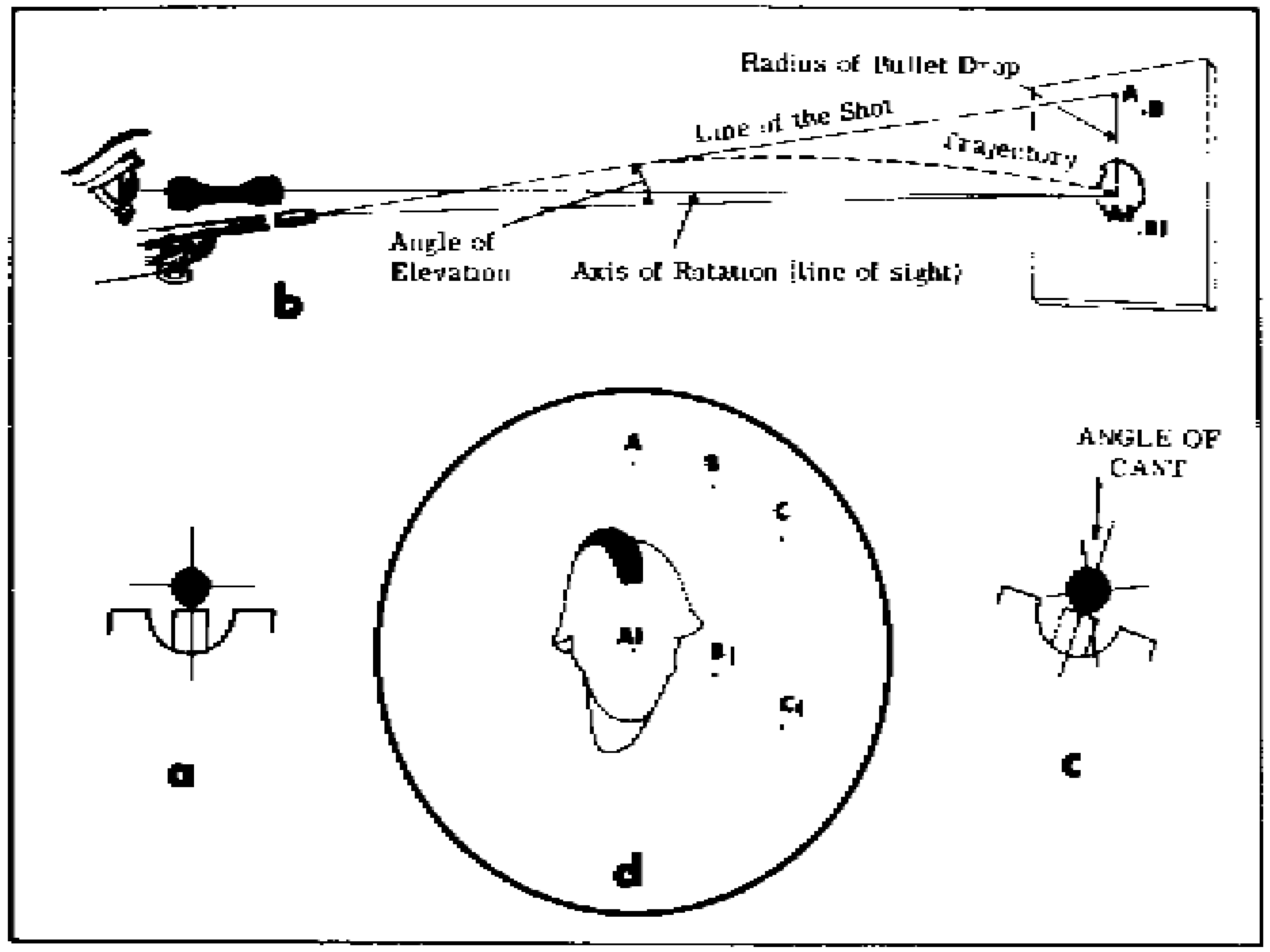


Figure 31. --Canting the Rifle.

4203. ADVANTAGES OF TELESCOPIC SIGHTS

The telescopic sight permits:

a. Extreme accuracy in aiming which enables the sniper to fire at distant, barely perceptible, and camouflaged targets which are not visible to the naked eye.

b. Rapidity in aiming because the sniper's eye sees the crosshairs and the target, with equal clarity, in one focal plane.

c. Accuracy of fire under conditions of unfavorable illumination such as at dawn and dusk and during periods of limited visibility (moonlight, fog).

d. Better observation of the battle area, more accurate range determination and correction

for windage and elevation errors.

4204. CANTING

Canting is the act of tipping the rifle to either side of the vertical. Figure 31a shows a proper sight picture in which the rifle or scope sights and the rifle barrel are in vertical alignment. Figure 31b shows the relation between the sniper's line of sight and the line of elevation of the rifle barrel (line of the shot). As the bullet leaves the rifle, it is headed for Point A, but the force of gravity causes it to drop and strike the target at Point A_1, the desired point of impact. Figure 31c illustrates a canted rifle; the sights are tipped slightly to the right. In this instance, the sniper's line of sight still terminates at Point A_1 on the target, but the line of the shot now points to B instead of A. The bullet drops identically as in the first shot, but the drop is from Point B and the impact is at B_1. A more pronounced cant will move the bullet strike farther out and down as shown in the inset figure 31d.

4301. GENERAL

A correct shooting position is essential to sniping. The better the position, the easier it is to hold the rifle and control the trigger while the sight picture is correct. Instruction in sling adjustment should precede position instructions since the sling is an important aid in the steady holding of the rifle.

4302. RIFLE SLINGS

a. Purpose. --The rifle sling has a twofold purpose. It permits maximum stability when adjusted properly, and it reduces the effects of recoil.

b. Adjustment of the Sling

(1) Loop Sling. --(See fig. 32.) To form a loop sling for a right-handed sniper, place the butt of the rifle on the right hip and cradle the rifle in the crook of the right arm, leaving both hands free to adjust the sling. Unhook the sling from the lower sling swivel; with the buckle down on the hook, feed the sling through the top of the buckle to form a loop. Give the loop a half turn to the left and insert the left arm through the loop, positioning the buckle on the outside of the arm. As tension is applied to the sling, the loop will tighten. To adjust the sling tension, loosen the keeper and pull the feed end down toward the loop until proper tension is obtained. This adjustment varies with each individual and position. Move the keeper toward the arm and tighten it. Place the left hand over the sling and under the rifle, moving it forward to the upper sling swivel so that the rifle rests in the "V" formed by the thumb and forefinger. The loop sling is used in the



Figure 32. --Loop Sling.

prone, sitting, and kneeling positions. After the proper sling tension has been determined for those positions, the sniper should mark his sling for each adjustment.

(2) Hasty Sling. --The hasty sling is used when time does not permit loop sling adjustment. To adjust for the hasty position, the keeper is moved approximately 6 inches away from the upper sling swivel The strap is then



Figure 33. --Hasty Sling.

loosened and adjusted on the arm as shown in figure 33. The sling is given a half left twist prior to placing on the arm.

4303. ELEMENTS OF A GOOD SHOOTING POSITION

The three elements of a good position are bone support, muscular relaxation, and natural point of aim on an aiming point.

a. Bone Support.--A strong foundation is just as necessary to a rifle as to a well-built house. Good shooting positions are based on the principle of employing the bones, not the muscles, as the rifle foundation.

b. Muscular Relaxation.--The sniper must learn to relax in the various firing positions. Undue strain or tension causes trembling which is transmitted to the rifle. Only through practice and by assuming a natural point of aim will the sniper achieve muscular relaxation.

c. Natural Point of Aim.--Since the rifle becomes an extension of the body, it is necessary to adjust the body position until the rifle points naturally at the target. With the rifle at his shoulder, the sniper takes aim. He then closes his eyes and relaxes. If the crosshairs are still on target when the sniper opens his eyes, he has the natural point of aim. By moving his feet or body, he can shift the natural point of aim to any desired target.

4304. SHOOTING POSITIONS

a. General.--The four basic shooting positions used in sniper training are prone, sitting, kneeling, and standing. These positions are sufficiently flexible to allow modifications according to the body conformation. On the battlefield, a sniper must assume the steadiest possible position which can allow observation of the target area and provide some cover and/or concealment. Considering the many variables of terrain,

vegetation, and tactical situations, there are innumerable possible positions; however, in most instances, they will be variations of the four listed above. Some snipers will have more difficulty in assuming a particular position than will others. So long as the sniper applies the fundamentals of relaxation and maximum support for his rifle, he should be permitted to adjust the position to fit his own body conformation. Throughout position training, the sniper must be continually checked on the proper application of position principle. This check is the responsibility of the instructor who must closely observe the sniper during all phases of fundamental training.

b. Factors Common to All Positions.--There are seven factors involved in holding the rifle while aiming and firing. These factors are the same for all firing positions; however, the precise manner in which they apply differs slightly with the various positions.

(1) Left Hand and Elbow.--The left hand is forward with the palm of the hand against the upper sling swivel. The wrist is straight and locked so that the rifle rests across the heel of the hand. The hand itself is relaxed. The fingers can be curled against but not gripping the stock since the rifle should rest on the left hand. The left elbow should be directly under the receiver of the rifle, or as close to this position as the conformation of the body will permit. With the left elbow directly under the rifle, the bones (rather than the muscles) support the rifle's weight. (See fig. 34.) The farther away from this position that the elbow is located, the greater will be the muscular effort necessary to support the rifle. The resulting muscle tension causes trembling and a corresponding movement of the rifle. The sniper trainee, by trial and error, must find the left hand and elbow position best

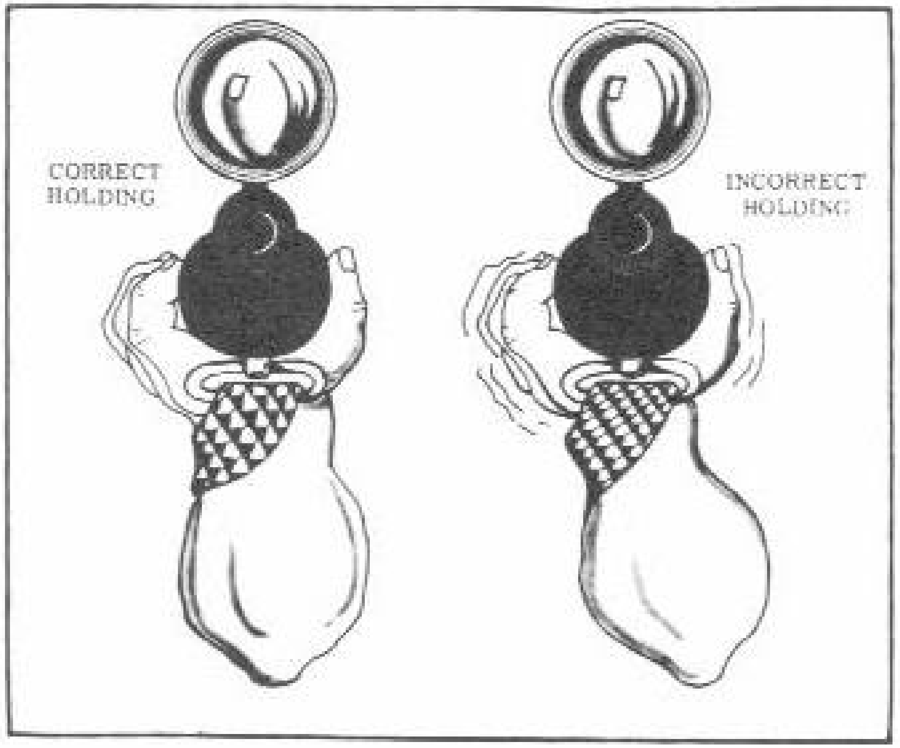


Figure 34.--Bone Support--Left Elbow Position.

suited to him to avoid tension and trembling.

(2) Rifle Butt in the Pocket of the Shoulder.--The sniper places the rifle butt firmly into the pocket of the right shoulder. The proper placement of the butt helps steady the rifle, prevents the rifle butt from slipping on the shoulder during firing, and lessens the effect of recoil.

(3) Grip of the Right Hand.--The right hand grips the small of the stock firmly, but not rigidly. A firm rearward pressure is exerted by the right hand to keep the rifle butt in its proper position in the pocket of the shoulder, and to keep the butt secure enough against the shoulder to

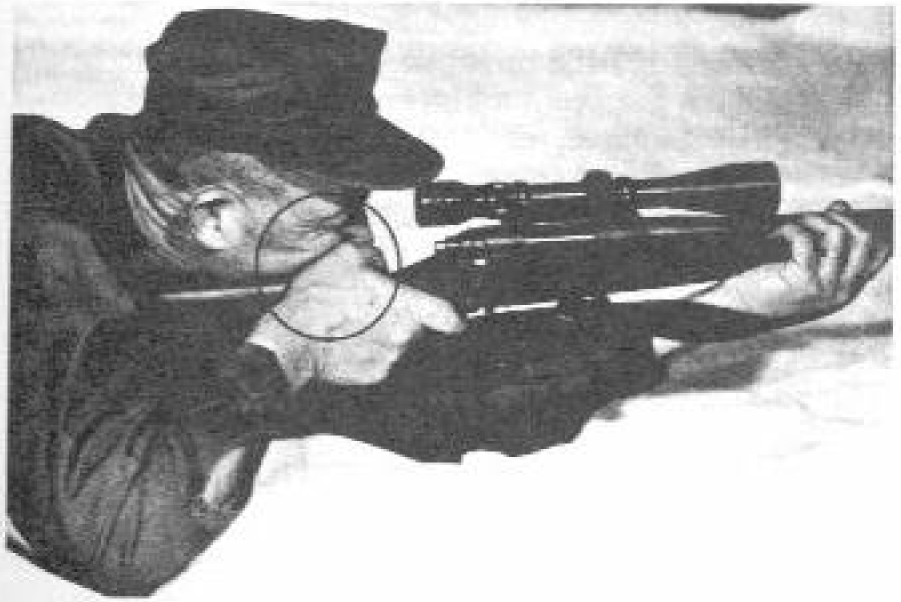


Figure 35.--The Spot Weld.

reduce effects of recoil. The thumb extends over the small of the stock to enable the sniper to obtain a spot weld. The trigger finger is positioned on the trigger so there is no contact between the finger and the side of the stock. This permits the trigger to be pressed straight to the rear without disturbing the aim.

(4) Right Elbow.--The placement of the right elbow gives balance to the sniper's position. Correctly positioned, the elbow helps form the shoulder pocket. The exact location of the right elbow varies with each position and will be described in the explanation of each position.

(5) Spot Weld.--The spot weld is the point of firm contact between the sniper's cheek and thumb on the small of the stock. (See fig. 35.) It is obtained by lowering the cheek to the

thumb, which is curled over the small of the stock, and rolling up a pad of flesh against the cheekbone to act as a buffer. The firm contact between the head, hand, and rifle enables the head and weapon to recoil as one unit, facilitating rapid recovery between rounds. The spot weld also enables the eye to be positioned the same distance behind the eyepiece (eye relief) of the telescope each time the rifle is aimed and fired. This guarantees the same field of vision with each sight picture, thus further assisting in accurate aiming. If the sniper is unable to obtain a spot weld, he should use the stock weld; i.e., place his cheek directly against the stock. (See fig. 36.)

(6) Breathing.--Normal breathing, while aiming and firing the rifle, will cause a movement of the rifle. To avoid this, the sniper must learn to hold his breath for the few seconds required to aim and fire. He takes a normal breath, releases part of it, and holds the remainder. He should not hold his breath for more than approximately 10 seconds or his vision may blur and lung strain may cause muscular tension.

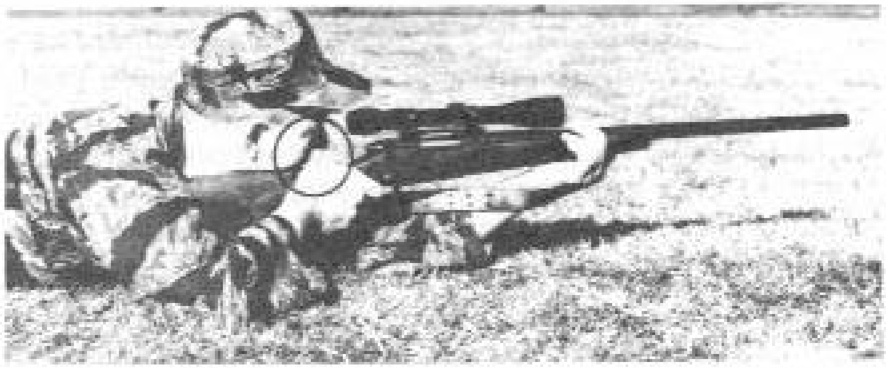


Figure 36.--The Stock Weld.

(7) Relaxation.--The sniper must relax properly in each firing position. Undue strain indicates that muscles are doing work which should be done by bones and that the sniper has, therefore, adopted an improper position. He must adjust his position until he is able to relax without violating any of the other holding rules. In a proper firing position, the sniper can relax but still maintain his sight picture.

c. Prone Position.--The prone position is a relatively steady position which is easy to assume. The position presents a low silhouette and is well adapted to the principle of cover and support. To assume the prone position, the sniper stands facing the target with the left hand forward to the upper sling swivel and the right hand grasping the stock at the heel of the butt. He spreads his feet comfortably apart, shifts his weight slightly rearward, and drops to his knees. He grounds the toe of the rifle butt well forward on a line between his right knee and the target and rolls down on his left side, placing his left elbow well forward on the same line. (The rifle is grounded gently to protect the telescope.) With his right hand, he forces the butt of the rifle into his right shoulder. He then grips the small of the stock with his right hand and lowers his right elbow to the ground so that his shoulders are approximately level. He then secures a spot weld and relaxes into the tension of the sling. To adjust the natural point of aim to the target, he uses his left elbow as a pivot to move his body until the crosshairs are on the target. He has a well-balanced position if the crosshairs move between 6 o'clock and 12 o'clock, as he breathes. (See fig. 37.)

d. Prone Position Checks.--The checks which the instructor or sniper should observe are as follows:

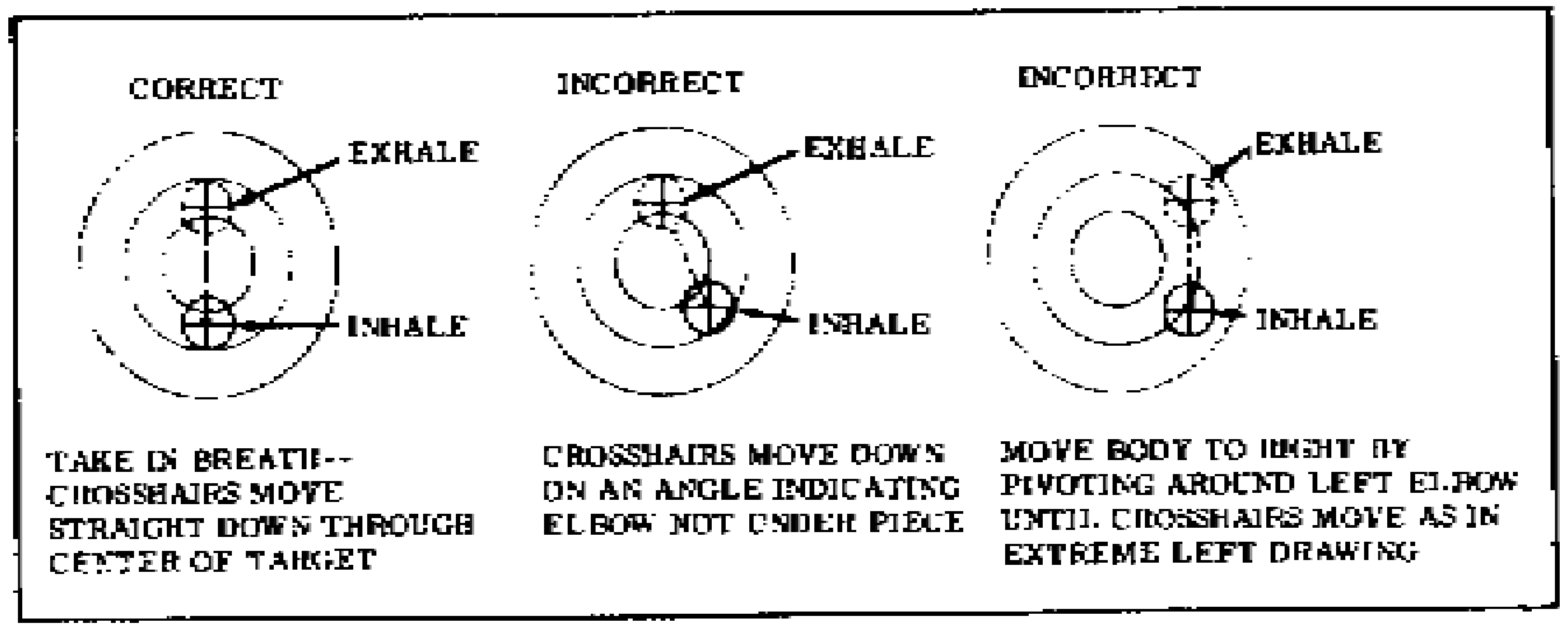


Figure 37. --Breathing Check for Position.

(1) Rifle is vertical (crosshairs level).

(2) Left hand is forward to upper sling swivel (when possible).

(3) Rifle rests in "V" formed by the left thumb and forefinger, supported by the heel of the hand (not the fingers).

(4) Left elbow is well under the receiver (as far as body conformation permits).

(5) Sling is high on left arm.

(6) Rifle butt is close to the neck, in the shoulder pocket.

(7) Shoulders are approximately level (to prevent canting).

(8) Body is well behind the rifle (to absorb the recoil).

(9) Face is firmly fixed on the thumb or stock (spot weld) with proper eye relief.

(10) There is space between trigger finger and stock.

(11) Trigger finger presses straight to the rear.

e. Sitting Positions. --There are three variations of the sitting position: open leg, crossed leg, and crossed ankle positions. The positions are equally satisfactory, depending on

the sniper's body conformation. He must choose the one which gives him the most stability and ease.

(1) Open Leg. --For the open leg position, the sling is shortened about 2 or 3 inches from the prone position adjustment. The sniper then faces half right from the target, crosses the left foot over the right foot, and sits down. He extends his legs a comfortable distance and spreads his feet 36 inches apart. Bending forward at the waist, the sniper aligns his left upper arm against the inside of his left shin. With the right hand at the butt, he pushes the rifle forward and places the butt into the right shoulder. He then moves the right hand forward, grasps the small of the stock, and lowers the upper arm until it rests inside the right knee. By pointing his toes inward, he prevents his knees from spreading and maintains pressure on his upper arms. The position is completed by relaxing the weight forward and assuming the correct spot weld.

(2) Crossed Leg. --The difference between the crossed leg and the open leg positions is very slight. For the crossed leg position, the sniper proceeds as for the open leg position except that after sitting down, he simply keeps his feet in place and positions his upper arms inside his knees. Many snipers use the crossed leg position because it can be assumed quickly.

(3) Crossed Ankle. --For this position, the sniper crosses his ankles, sits down, and slides his feet forward. Bending at the waist, he places his upper arms inside his knees. As in the other positions, it is mandatory that adjustment of the natural point of aim be accomplished by body movement and not by muscle tension. In the sitting positions, this is done by moving either foot, both feet, or the buttocks until the sights and target are naturally aligned.

(4) Sitting Position Checks.--There are certain checks that should be made to ensure that the sitting positions adhere to the fundamentals:

(a) Rifle is vertical (crosshairs level).

(b) Left hand is forward to upper sling swivel (if possible).

(c) Rifle rests in the "V" formed by the left thumb and forefinger and is supported by the heel of the hand with fingers relaxed.

(d) Left elbow is approximately under the receiver.

(e) Right upper arm is blocked in front of the right knee.

(f) Sling is high on left arm.

(g) Shoulders are approximately level to prevent canting.

(h) Butt of rifle is close to neck and positioned in the pocket of the shoulder.

(i) Face is firmly fixed on thumb or stock (spot weld) with proper eye relief.

(j) There is space between trigger finger and stock.

(k) There is less distance between the knees than the heels (open leg position).

(l) Trigger finger presses straight to the rear.

f. Kneeling Position.--As with the sitting position, there are three variations of the kneeling position: the low, medium, and high positions. The sniper uses the one best suited to him.

(1) Assuming Position

(a) Kneeling positions require level ground. The sniper kneels on his right knee so that his right leg is parallel to the target. He may then take any one of the three positions. For the low position, the ankle is turned down and the sniper sits on the inside of the ankle. In the median position, the ankle is straight and the foot

stretched out, shoelaces in contact with the ground. The sniper sits on his heel. In the high position, the ankle is straight, toe of the shoe in contact with the ground and curled forward by the body weight. The right side of the buttocks is placed on the right heel making a solid contact. When using these positions, the sniper will be in poor balance if he sits too far to the rear.

(b) From any of the above positions, the left leg is extended toward the target with the foot flat on the deck. For maximum support, the toes should be pointed approximately in the direction of the target. To avoid side movement, the left toes are turned slightly to the right by pivoting on the heel. When in position, the left foot may be pushed forward or pulled back slightly to lower or raise the muzzle.

(c) The lower left leg must be positioned properly to provide maximum support for control of the rifle. From a front view, the lower left leg should be approximately vertical. In this position, the left leg is using the bone principle to support the weight of the body.

(d) The right elbow is normally held shoulder high to make a pocket for the butt of the rifle. The elbow may be lower if a pocket can be formed without the rifle butt slipping out of the shoulder. The left arm supports the rifle so it is important to notice the relative positions of the various parts of the arm. On the upper arm there is a flat surface just behind the elbow. This portion of the arm is placed against the similarly flat spot on the right side of the left knee. Placing the flat surfaces of the arm and knee together causes the elbow to be forward of the knee, and allows the weight of the body to be transferred forward to the left leg. The left leg must be placed under the rifle to achieve maximum support. There is daylight between the sling and the

crook of the left elbow to indicate support of the forearm from the upper arm. The sling supports the bones and in turn the bones support the rifle. Approximately 60 percent of the weight of the body is transmitted forward to the left leg, reducing the strain on the right foot and leg and resulting in a relaxed position.

(2) Kneeling Position Checks. --Checks to ensure that the kneeling positions adhere to the fundamentals are as follows:

(a) Rifle is vertical (crosshairs level).

(b) Rifle rests in the "V" formed by the thumb and forefinger, fingers relaxed.

(c) Left hand is forward to sling swivel (if possible).

(d) Left leg is approximately vertical from frontal view.

(e) Right elbow is approximately shoulder high.

(f) Weight of the body is forward on left leg.

(g) Face is fixed firmly on thumb or stock (spot weld) and there is proper eye relief.

(h) Daylight shows between trigger finger and stock.

(i) Trigger finger presses straight to the rear.

(j) Sling is high on the arm.

(k) Daylight shows between the sling and crook of left elbow.

g. Standing Position. --The standing position is the least steady and the most difficult to master. However, with proper observation of the fundamentals, excellent results can be obtained.

(1) Assuming Position. --The sniper faces his target, executes a right face, and spreads his feet comfortably. His feet must be level to obtain a natural point of aim. With his

right hand at the small of the stock, he places the rifle butt high against his shoulder so that the eyepiece of the telescope is level with his eyes. He holds his right elbow high to form a shoulder pocket. This also permits him to exert a strong upward and rearward pressure with his right arm and hand. He holds most of the rifle weight with his right arm and places his left hand under the rifle in a position to best support and steady the rifle. He distributes his weight evenly to both hips. The spot weld for standing is very seldom the same as for the other positions because it is difficult in this position to place the cheek against the right thumb. To maintain proper eye relief, the cheek must be placed against the stock in the same way and at the same place, everytime. Each sniper can, by practice, determine his proper spot weld.

(2) Shooting in Wind. --In the standing position, since the entire body is exposed, the rifle will move considerably with changes in wind velocity or direction. Under this condition, the sniper must wait for a lull or for a period of constancy in wind velocity and direction. While waiting, he allows his body to move with the wind, but, at the lull, he quickly acquires the correct sight picture, executes a controlled trigger pressure, and fires a well-aimed shot.

(3) Holding Exercises. --Holding exercises will greatly improve the sniper's proficiency from the standing position. In these exercises, the sniper dry fires and remains in position for a specified period, gradually increasing the time from 30 seconds to 1 minute as training progresses. To avoid excessive fatigue, no more than 20 repetitions should be conducted during one training session.

(4) Standing Position Checks. --Points to be checked to ascertain that the standing position

is correct are as follows:

(a) Rifle is vertical (crosshairs level).

(b) Feet are level and comfortably spread.

(c) Weight is equally distributed to both feet and hips.

(d) Butt of rifle is high in shoulder and close to neck.

(e) Natural point of aim is achieved.

(f) Spot weld is constant.

(g) Neck and torso are relaxed.

(h) Daylight shows between trigger finger and stock.

4305. SUPPORTED POSITIONS

a. General.--During training in fundamentals, positions are taught in a step-by-step process by which the sniper is guided through a series of precise movements until he obtains the correct position. The purpose of this is to ensure that he knows and correctly applies all of the factors which can assist him in holding the rifle steady. He will gradually become accustomed to the feel of the positions through practice, and will know instinctively whether his position is correct. This is particularly important in combat since the sniper must be able to assume positions rapidly. There are any number of intermediate positions a sniper in combat might use before assuming his final firing position. Consequently, he must know that his position is correct without having had to follow a set sequence of movement. IN COMBAT SITUATIONS, THE SNIPER MUST BE PREPARED TO ENHANCE THE STABILITY OF THE POSITION HE CHOOSES BY ADAPTING IT TO ANY

AVAILABLE ARTIFICIAL SUPPORT.

b. Fundamentals Applicable to All Supported Positions.--On the battlefield a sniper must assume the steadiest position which still provides observation of the target area and cover or concealment. Considering the many variables of terrain, vegetation, and tactical situations, there are innumerable positions that might be used. However, in most instances, field supported sniper positions will be variations of those learned during basic marksmanship training and annual known-distance range firing. In assuming a field supported position, the sniper should:

(1) Use any available support. Empty sandbags, carried and filled when time permits, rocks, logs, pack, dikes, tree branches, or a sharp rise in terrain are examples.

(2) Avoid touching any part of the support with the rifle barrel.

(3) Adjust position to fit the support.

(4) Use prone position whenever possible.

c. Stability of Weapon.--In supported positions, factors affecting weapon stability are identical to those taught during marksmanship training on unsupported positions. The stability of the rifle and the effectiveness of the sniper will be increased by application of the following four holding factors:

(1) Grip of the Right Hand.--The right hand is placed on the small of the stock. The right thumb is curled over the stock and the forefinger is placed on the trigger without touching the side of the stock. The remaining fingers of the right hand are curled around the small of the stock.

(2) Position of the Cheek (Spot Weld).--A conscious effort must be made to place the

cheek at the same spot on the stock each time the weapon is fired.

(3) Placement of Elbows. --The placement of the elbows provides balance to the position. Correctly positioned, the right elbow helps form a pocket in the shoulder for the rifle butt. The exact location of the elbows varies with each position. So long as the sniper applies the fundamentals of maximum support for his rifle, he should be permitted to adjust the elbows to his own preference.

(4) Position of Left Hand. --The location of the left hand, in supported positions, varies with each position and situation. The sniper must adjust the left hand to his preference within scope of holding fundamentals.

Section IV. TRIGGER CONTROL

4401. GENERAL

Trigger control is the skillful manipulation of the trigger by which the sniper causes the rifle to fire without disturbing the alignment of the rifle with respect to the target.

4402. APPLICATION OF TRIGGER CONTROL

a. Finger Placement. --The trigger finger should contact the trigger at some point between the tip and the second joint of the finger. The exact placement is a matter of individual preference and depends on the size of the sniper's hand and the manner in which he grips the stock.

b. Trigger Weight. --The trigger weight (usually between 3 and 5 pounds) determines the amount of trigger press the sniper must control as the "press" is terminated and the firing pin is released.

c. Technique of Trigger Control. --During the firing process, a gradual increase of pressure is applied straight to the rear on the trigger as long as the crosshairs quarter the target. Trigger control is very important since the crosshair cannot be held indefinitely on the point of aim. The sniper must be able to stop pressure on the trigger when the crosshairs move from the point of aim. The sniper will apply pressure until only a small additional pressure is required to release the firing pin. He applies the remaining pressure when the crosshairs become motionless and the target is quartered.

4403. FACTORS AFFECTING TRIGGER CONTROL

a. General. --The upper part of the trigger

finger should be kept clear of the stock to allow a "front-to-rear" movement in the press of the trigger. Touching the side of the stock, the finger will cause pressure at a slight angle rather than straight to the rear. Such a side pressure, no matter how slight, will pull the sights off the aiming point. A firm grip on the rifle stock is essential for good trigger control. If the sniper begins his trigger squeeze from a loose grip, he tends to squeeze the stock as well as the trigger and thus loses trigger control.

b. Common Errors.--Since trigger control is not only the most important steady hold factor but is also the most difficult marksmanship fundamental to master, the majority of shooting errors stem directly or indirectly from the improper application of this technique. Failure to hit the target frequently results from the shooter jerking the trigger or applying pressure on both the trigger and the side of the rifle. Either of these actions can produce misses. Therefore, instructors should always check for indications of improper trigger control since an error in this technique can start a chain reaction of other errors. Some of the indications of improper trigger control are:

(1) Flinch.--The flinch is an involuntary muscular tension in anticipation of recoil. It is indicated by a moving of the head, closing the eyes, tensing the left arm, moving the shoulders to the rear, or a combination of these.

(2) Buck.--The buck is an attempt to take up the recoil before it occurs, by tensing shoulder muscles and moving the shoulder forward.

(3) Jerk.--The jerk is an attempt to make the rifle fire at an exact time by sudden pressure on the trigger thus disturbing the alignment of the rifle with respect to the target.

4404. FOLLOWTHROUGH

Followthrough is the continued mental and physical application of the fundamentals after each round has been fired. The sniper does not shift his position, move his head, or let the muzzle of the rifle drop until a few seconds after the rifle has been fired. This procedure ensures that there will be no undue movement of the rifle until the round has been fired. From a training viewpoint, followthrough can assist the sniper to correct his own errors. By knowing his sight picture the instant the round is fired, he can analyze his shot group in relation to this sight picture and correct himself accordingly. In combat, followthrough (at times) allows the sniper to observe the strike of his bullet in relation to his aiming point, enabling him, if necessary, to correctly adjust his sights for a second round.

4405. CALLING THE SHOT

In calling the shot, the sniper predicts where the shot will hit the target. This is done both while snapping-in and during actual firing. The sniper calls the shot by noting the position of the crosshairs in relation to the aiming point as the round was fired. If his shots are not "on call," the sniper must review the fundamentals to isolate his problem. If he is not violating any fundamental, a sight change is indicated. Unless he can accurately call his shots, the sniper will not be able to zero his weapon.

Section V. SIGHT ADJUSTMENT

4501. GENERAL

Prior to zeroing his rifle, the sniper must understand how to adjust for focus and to mount the telescope as discussed in chapter 3, section I. In addition, he must understand the use of the elevation and windage rule, how to use the elevation and windage scales, and how to make sight adjustments as discussed in this section.

4502. TELESCOPE, RIFLE, REDFIELD 3x9 VARIABLE, WITH ACCU-RANGE

a. General.--The Redfield telescope has an elevation and windage turret assembly for making sight adjustments. Both the elevation and windage turrets within the assembly are identical in appearance and movement. Each turret has a dial with an arrow indicating direction of movement; the elevation dial reads "UP"; the windage dial reads "R" for right. Each turret contains an adjusting screw for making elevation and/or windage adjustments. The elevation adjusting screw affects the strike of the bullet vertically, while the windage adjusting screw affects it horizontally. There are no audible clicks when the adjusting screws are turned, making it necessary to set the sights by eye. The elevation and windage adjustments are graduated in 1/2-minute of angle. Additional information on reticle movement, power selection, use of the range finder (Accu-Range), and mounting procedures is in chapter 3, section I.

b. Elevation and Windage Rule.--A 1/2-minute adjustment in elevation or windage will move the strike of the bullet 1/2 inch on the target for each 100 yards of range (e.g., if the

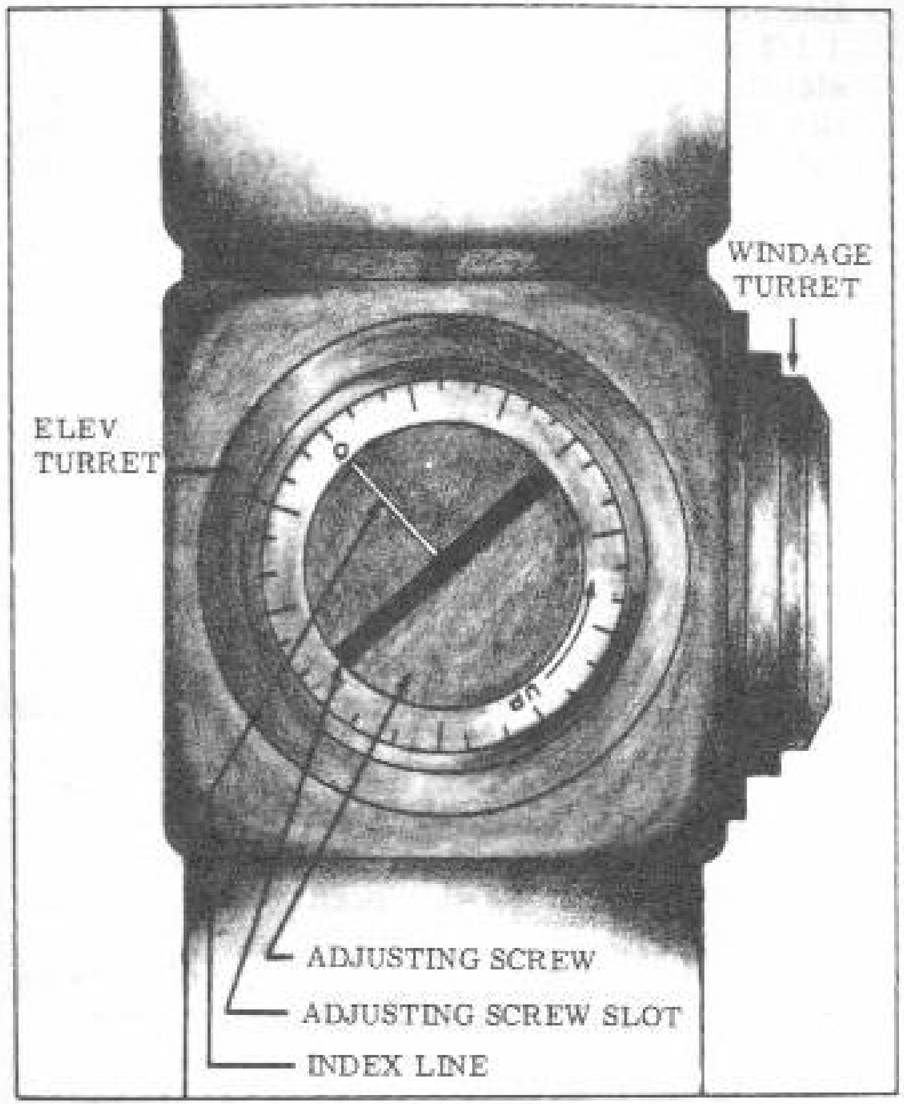


Figure 38.--Redfield Turret Assembly.

elevation is raised 2 minutes at a range of 300 yards, the strike of the bullet will be raised 6 inches).

c. Scale Reading.--(See fig. 38.) The scale on each outer disc has 33 index lines, each representing 1/2 minute of movement. Each long

line represents three 1/2-minute segments, or 1 1/2 minutes of movement. The windage and/or elevation screw has one index line. One revolution of the adjusting screw equals 33 half minutes (33 one-half inches) or 16 1/2 full minutes (16 1/2 inches). When recording zeros, it is necessary to read the scale by counting the number of index lines on the dial from the fully down position.

d. Marking the Sights.--Sight settings that fall within the first complete rotation (from fully down) of the elevating screw should be indexed in some manner. For example, a white line painted at the points of the 200-, 300-, 500-, and if possible, 600-yard zeros would expedite sight settings for those ranges in the field. Since the sniper habitually carries his rifle with the 500-yard zero set on it, he can make rapid adjustment for shorter ranges, and by using the same lines as reference points, he can also adjust for ranges to 1,000 yards. In the same manner, the windage turret should be marked to indicate his true zero.

e. Sight Changes.--To make sight changes the sniper first determines the distance from the center of his shot group to the desired location. The distance in elevation is determined vertically, while distance in windage is determined horizontally. These distances are converted to minutes (inches) by using the elevation and windage rule. To raise the strike of the bullet, the elevation adjusting screw is rotated COUNTERCLOCKWISE. To move the strike of the bullet right, the adjusting screw is rotated COUNTERCLOCKWISE. Conversely, to move the strike of the bullet down and/or left, the respective adjusting screw is rotated CLOCKWISE. CAUTION: Do not turn the adjusting screws beyond the (upward) reticle movement; maximum is three revolutions from the fully down position.

Additional turning will disengage the screws from the spindle.

Section VI. EFFECTS OF WEATHER

4601. GENERAL

Effects of weather can cause serious error in the strike of the bullet. The wind, light, temperature, and humidity all have some effect on the bullet, the sniper, or both. Under average conditions, some weather effects, such as temperature and humidity, are relatively insignificant, but since sniping is sometimes done under extremes of weather, all effects must be considered.

4602. EFFECTS OF WIND

a. General. --Wind, usually, is the greatest weather problem. Wind effect on the bullet increases as the wind velocity increases, as wind approaches a cross direction, and as the target distance increases. Wind also affects the sniper, particularly in the standing position. The stronger the wind, the more difficulty he has in holding the rifle steady. This effect can be offset by use of supported positions.

b. Classification of Winds. --Winds are classified according to the direction from which they are blowing in relation to the direction of fire. The "clock system" (see fig. 39) is used to indicate this direction. A wind blowing from right to left across the sniper's front is called a "3 o'clock wind." A wind blowing toward the sniper from his left front is called an "11 o'clock wind." The direction from which the wind is blowing also denotes the fractional value of the wind in relation to the wind's total velocity. Winds from either flank are "full value," those from the oblique are "half value," and those from front or rear are "no value" winds. A half value wind affects the bullet approximately half as much

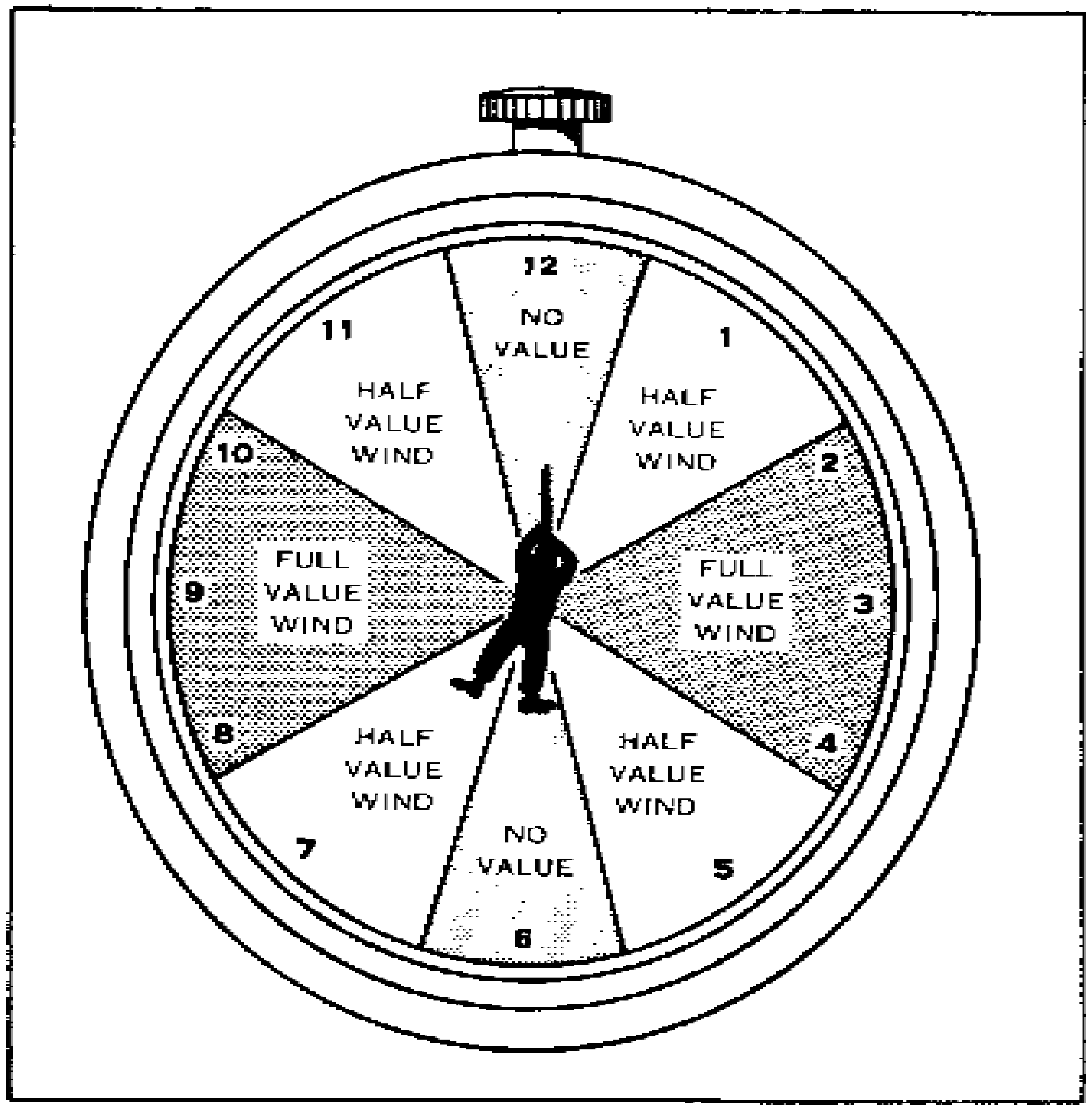


Figure 39. --Clock System.

as a full value wind. That is, a 1 o'clock wind having a velocity of 10 miles per hour is equivalent to a 4-mile per hour 3 o'clock wind.

c. Wind Velocity. --There are three common field expedient methods of approximating wind velocities. Since the tactical situation may preclude the use of some methods, snipers must be thoroughly familiar with all.

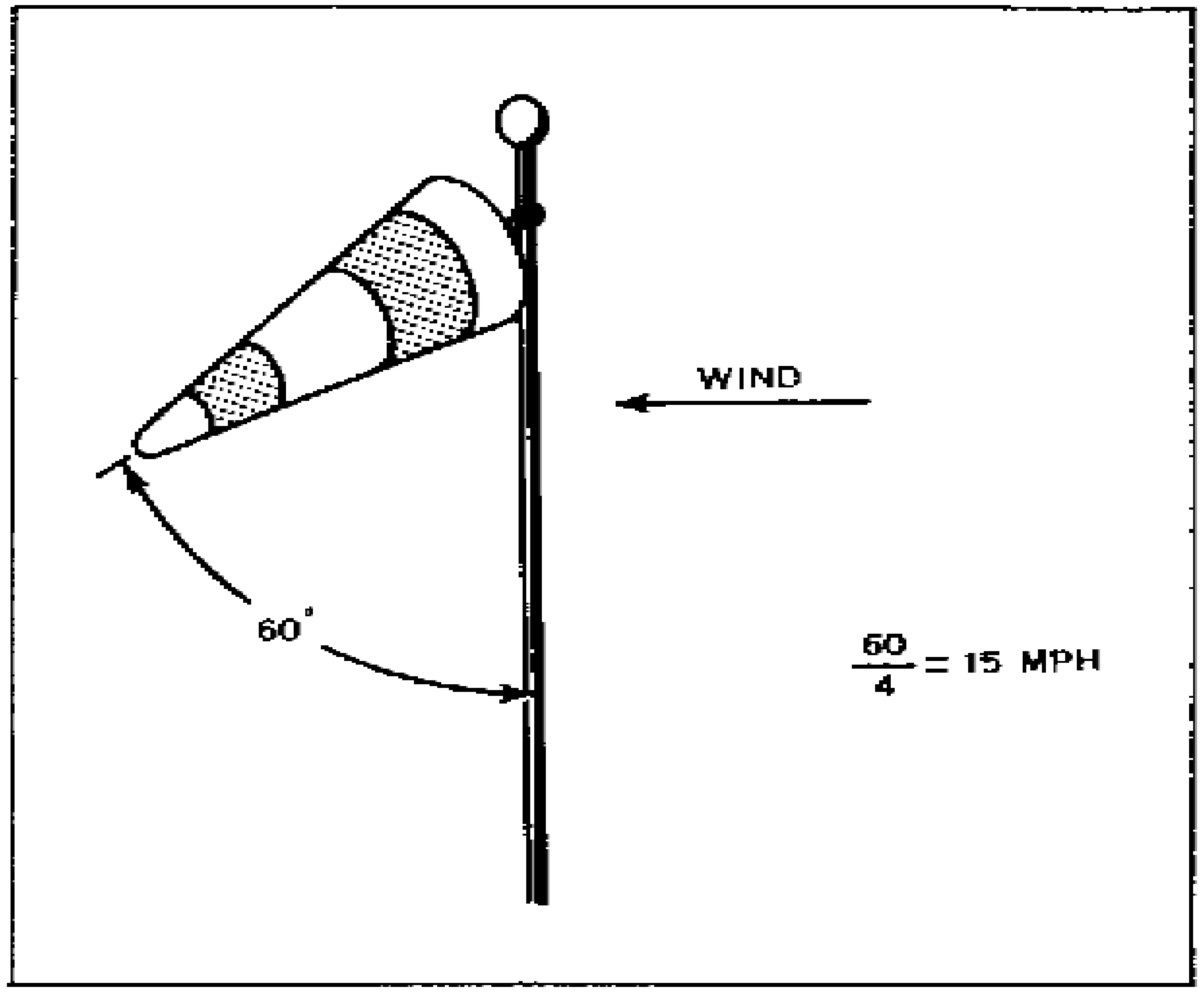


Figure 40. --Flag Method.

(1) Flag Method. --If a sniper can observe a flag (or any clothlike material similar to a flag) hanging from a pole, he may estimate the angle (in degrees) formed at the juncture of the flag and the pole and divide this angle by the constant number "4" to get the wind velocity in miles per hour.

(2) Pointing Method. --(See fig. 41.) A piece of paper or other light material is dropped from the sniper's shoulder. He points to the spot where it lands and estimates the angle between his arm and body. This figure is divided by 4 as above.

(3) Observation Method. --If the tactical situation prevents the use of the above methods, snipers can use the following guides:

(a) A wind under 3 miles per hour can hardly be felt, but causes smoke to drift.

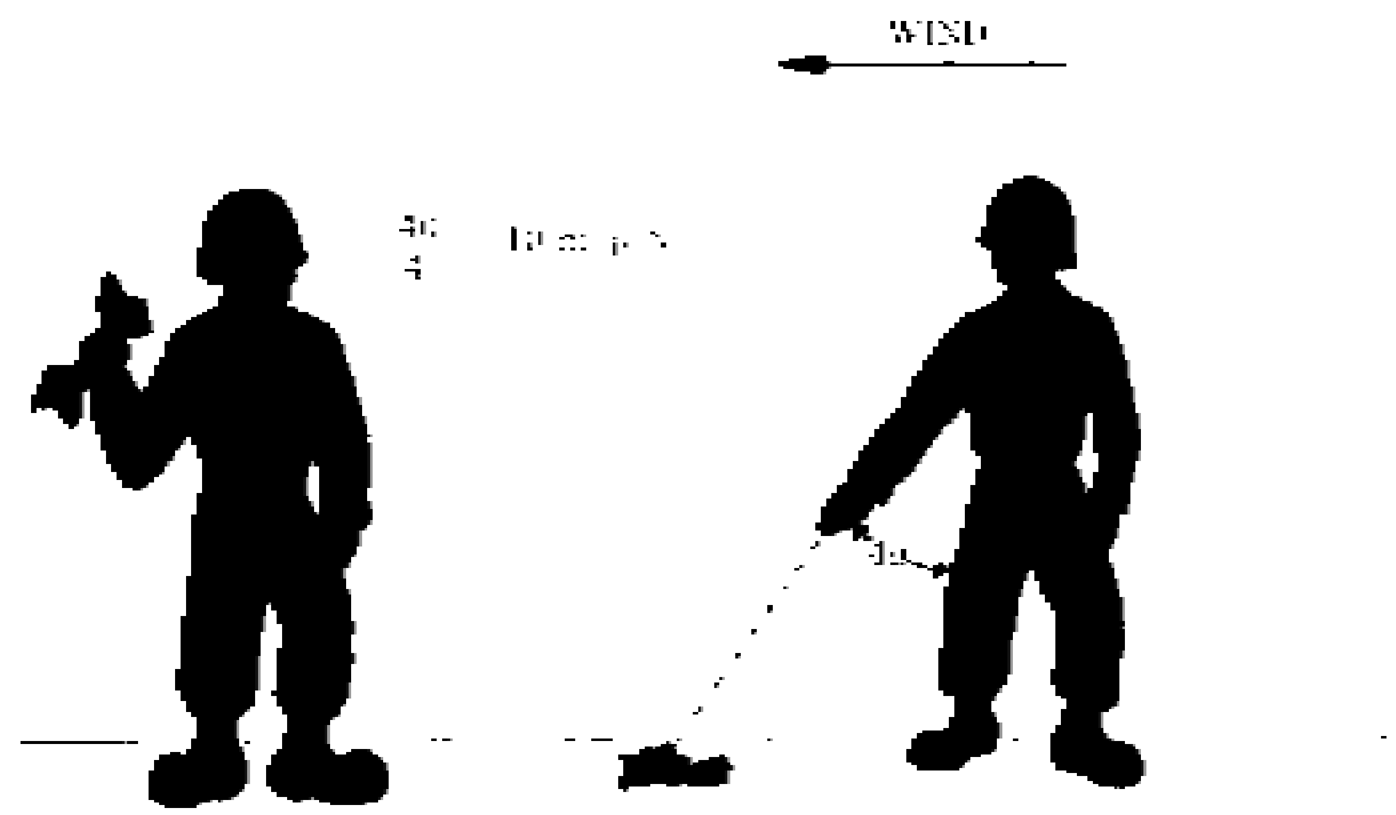


Figure 41. --Pointing Method.

(b) A 3- to 5-mile per hour wind is felt lightly on the face.

(c) A 5- to 8-mile per hour wind keeps tree leaves in constant motion.

(d) An 8- to 12-mile per hour wind raises dust and loose paper.

(e) A 12- to 15-mile per hour wind causes small trees to sway.

(4) Windage Conversion Table. --Appendix F contains a windage conversion chart showing effects of wind in minutes and inches. The clock system is also used to determine one-third, two-thirds, and full wind values based on the premise 1, 5, 7, and 11 o'clock equal one-third wind value; 2, 4, 8, and 10 o'clock equal two-thirds wind value; and 3 and 9 o'clock equal full wind value.

d. Use of M49 Spotting Scope. --The M49 spotting scope can be used to determine wind direction. By focusing the scope on an object being observed and rotating the eyepiece 1/4 to 1/2 turn counterclockwise, a mirage will appear short of the target. "Mirage," (See fig. 42) as here used, applies to the atmospheric phenomenon in which air appears to move in ascending waves; e.g., the sun heating the earth's surfaces causes heat waves in the same manner as heating a piece

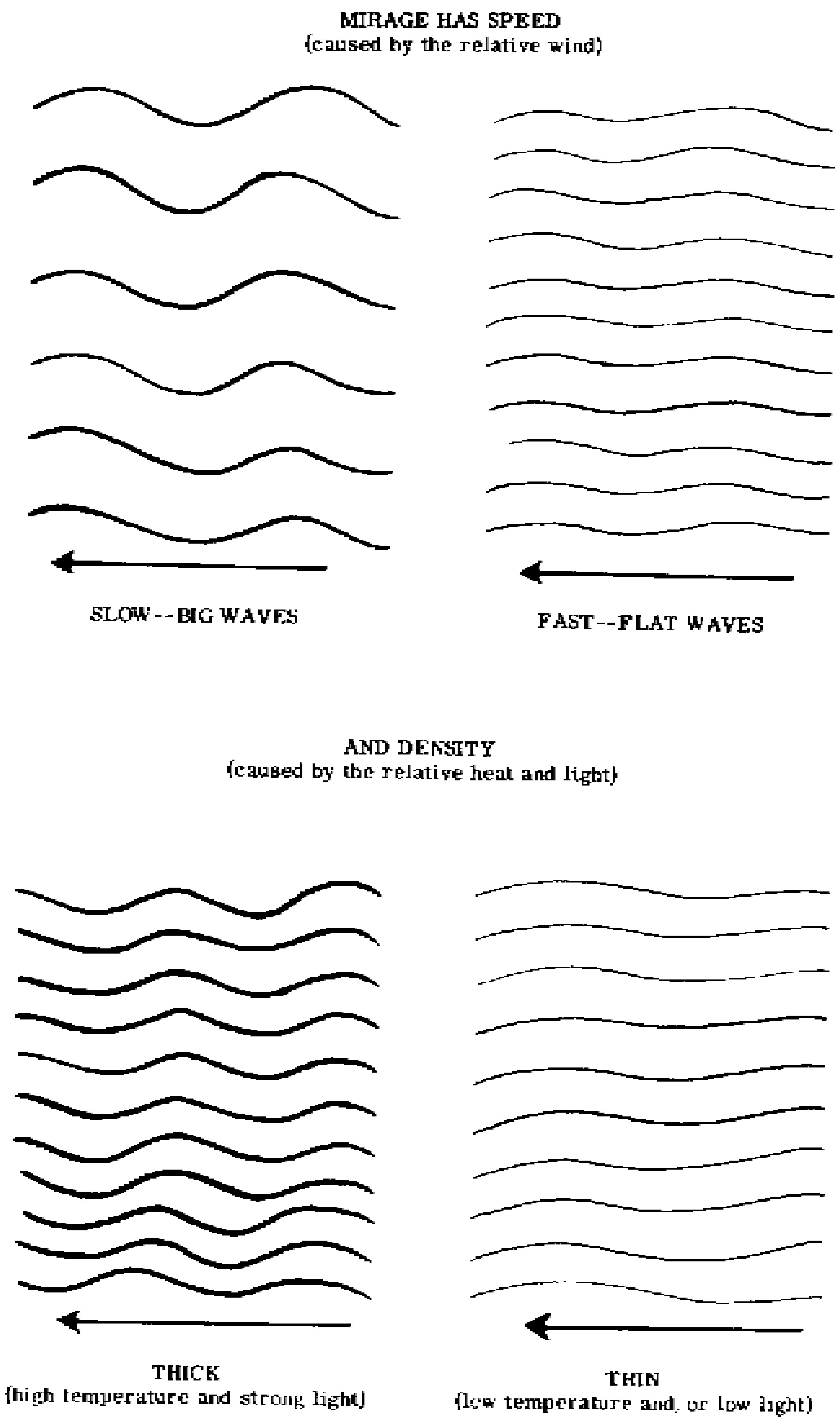


Figure 42.--Mirage.

of metal does. These waves appear to ripple or shimmer and rise straight up from the ground on a calm day. Any movement of air, however, will bend these waves in the direction of the air flow. Mirage is most pronounced on a bright, clear day and becomes more pronounced when viewed over unbroken terrain or where vegetation is sparse or lacking. Mirage always appears to be flowing from either 3 or 9 o'clock, or appears to be "boiling" and stationary when there is no wind or when the wind is blowing from 6 or 12 o'clock. If the mirage is flowing from the right, the wind is coming from either 1, 2, 3, 4, or 5 o'clock. To determine which, the scope is turned slowly to the right, but not beyond 3 o'clock. As the scope turns, the mirage may "boil." If so, the direction in which the scope points is the direction from which the wind is blowing; in this case, 1, 2, or 3 o'clock. If no "boil" occurs, turn the scope left but not beyond 9 o'clock. When the "boil" is seen, the direction in which the rear of the eyepiece of the scope is pointing is the direction from which the wind is blowing, 4 or 5 o'clock. Reverse the system for wind blowing from the left. By constant use of the "spotting scope" during training, the sniper will soon be able to estimate wind velocity or value by observing the speed of the flow of the mirage.

e. Determination of Windage Adjustment.--After finding the wind direction and velocity, the windage correction to be placed on the sight is determined by the formula: RxV/15= number of minutes of windage to be placed on the sight for a full value wind. R = range in hundreds of yards, V = velocity in miles per hour, and the number 15 is constant. For half value winds, divide the answer by 2. The formula is accurate up to ranges of 500 yards, but beyond 500 yards it varies due to bullet velocity loss. However, by changing the constant "15" as follows, the

correct windage may be determined:

600 yards; divide by 14
700 yards; divide by 13
800 yards; divide by 13
900 yards; divide by 12
1,000 yards; divide by 11

4603. EFFECTS OF LIGHT

This subject is controversial as light may have no effect on some snipers since light affects people in different ways. However, light conditions can effect the impact of a shot or shot group. Therefore, to solve the problem of light and its effects, the individual sniper must record the light conditions under which he shoots from day to day and through experience and study, determine the effect of light on his zero.

4604. HUMIDITY AND TEMPERATURE

a. Humidity. --As humidity increases, the air density increases, offering more resistance to the flight of the bullet through it. This resistance slows the bullet and lowers its point of impact, requiring the sniper to raise his elevation. The effects of humidity obviously increase with range. The experience of the sniper and his study of hits and groups under varied conditions will determine the effect of humidity on his zero. Changing combinations of weather cause variations in the effects on the bullet. For this reason, a sniper may fire 2 successive days on the same range and under what appears to be the same conditions and yet require two different sight settings. For example, a rise in the humidity of 30 percent cannot always be noticed readily. This rise in humidity makes the air more dense. If this heavier air is present with a 10-mile per hour wind, it will require more elevation and more windage to hit the same location than when the humidity was 30 percent lower.

b. Temperature. --The effect of temperature on the bullet is opposite to that of humidity, as higher temperatures of barrel and powder will increase chamber pressure and, consequently, the muzzle velocity. This will cause the bullet to strike high and requires lowering the elevation. Inversely, a drop in the temperature will require the sniper to raise his sights in order to hit the target in the same place. Arsenal tests indicate a variation in velocity of about 1.7 feet per second per degree of temperature, exclusive of the humidity factor. In such a case, 15 degrees would change the bullet strike by approximately 1 minute of elevation.

c. Humidity vs. Temperature. --From the preceding two paragraphs, the sniper may deduce rightfully that certain combinations of temperature and humidity will have little or no effect on his zero. For example, high humidity combined with high temperatures may affect the bullet the same as the quoted normal, since the humidity sets up a "drag" while temperature increases velocity; one overcomes the other. In the same manner, low humidity will allow the bullet to pass through the air with little resistance and temperatures slightly below normal will not slow the bullet sufficiently to cause a change in elevation. Other combinations such as high temperature and low humidity or high humidity and low temperature will have an opposite effect.

d. Considering All Effects of Weather. --Only by considering all of the effects of weather can a sniper learn to recognize which of them is his immediate problem. Proper recording and study based on experience are all important with

respect to determining the effects of weather. Probably the most difficult thing to impress upon a sniper is that evidence exists which calls for a change in his zero. If a change is indicated, it should be applied to all ranges.

Section VII. ZEROING

4701. PRINCIPLES OF ZEROING

a. Bullet Path and Point of Aim. --To understand the principles of zeroing, the sniper should have a basic knowledge of the relationship between the path of the bullet in flight and the line of aim. In flight, a bullet does not follow a straight line but travels in a curve or arc which is called trajectory. (See fig. 43.) The maximum height of a bullet's trajectory depends on the range to the target. The greater the distance a bullet travels before impact, the higher it must travel in its trajectory. On the other hand, the line of aim is a straight line from the eye through the telescope sight to the aiming point or target. After the bullet leaves the rifle, it is initially moving in an upward path, intersecting the line of aim; as the bullet travels, it begins to drop and eventually intersects the line of aim again. The range at which this intersection occurs is the zero for that range setting.

b. Definition of Zero. --The zero of a rifle is the sight setting in elevation and windage required to place a shot, or the center of a shot group, in the center of a target at a given range when no wind is blowing.

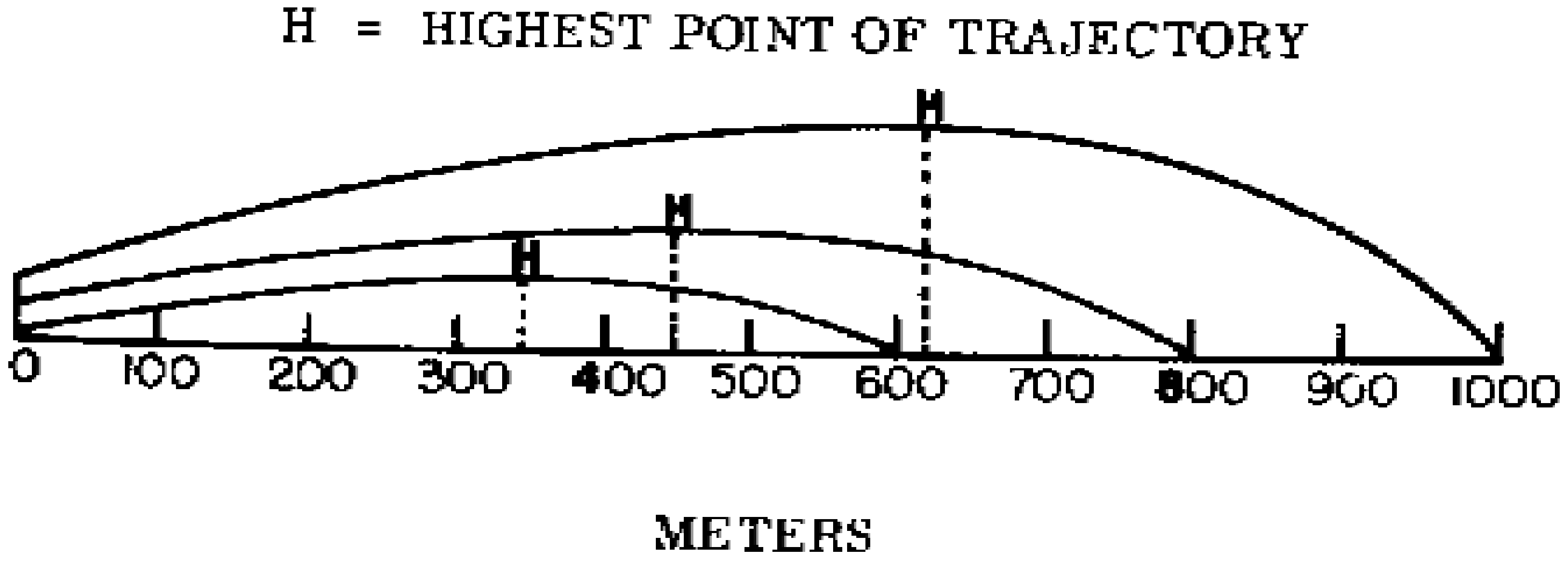


Figure 43. --Trajectory.

4702. METHODS OF ZEROING

a. General. --The following zeroing procedure will be used to establish zeros for various desired ranges. It is essential that all zeros are recorded in the sniper's notebook. Under adverse climatic conditions, sniper weapons and scopes should be returned to the appropriate maintenance facility approximately every 2 weeks to check the zero, re-zero, and perform other required maintenance.

b. Boresighting. --The initial zeroing phase should start at the 200-yard line. To facilitate getting the first shot "on target" quickly, it is recommended the rifle be boresighted prior to firing. This is done to place the axis of the rifle bore and the telescope on the same focal plane. The correct procedure to boresight a bolt operated rifle is:

(1) With bolt removed from the rifle, place the rifle on a solid support such as a sandbag.

(2) Looking through the barrel, adjust the rifle until the desired aiming point (target) is visible through the center of the bore.

(3) Without disturbing the lay of the rifle, look through the telescope and observe the position of the crosshairs in relation to the aiming point.

(4) If the crosshairs do not coincide with the aiming point as seen through the bore, adjust the elevation and windage screws/knobs until the crosshairs quarter the aiming point.

(5) Resight through the bore to ensure the rifle has not moved.

(6) Raise the elevation on the sight 3 1/2 minutes. The rifle should now be fired to confirm the rifle and telescope alignment.

c. Elevation Adjustments With Respect to Boresight. --After the weapon is boresighted, depending on the range to the target, an adjustment must be made in elevation. (See par. 4702b(6).) This is necessary to compensate

for the drop of the bullet for that particular range. Adjustments for the following ranges are:

Range (Yards)	Raise Elevation (Minutes)
100	1 1/2
200	3 1/2
300	6
400	9
500	12 1/2
600	16 1/2

NOTE: Boresighting rifles at ranges greater than 600 yards is not practicable.

d. Zeroing by Triangulation. --After the sniper has boresighted his rifle, he now fires triangulation to obtain his true zero. This is done by assuming the desired position and firing three three-round shot groups. Sight corrections are made after each three rounds (if required) to move the shot groups into the center of the target. After the 200-yard zero is obtained, the sniper should use the same procedure to arrive at a zero for 300, 400, 500, 600, 700, 800, 900, and 1,000 yards.

e. Normal Come-Up in Elevation. --As the range increases, the sniper must increase the elevation on the sight. Each sniper will determine his normal come-up as he zeros his weapon for each succeeding range. The average come-up in elevation between ranges is as follows:

From (Yards)	To (Yards)	Minutes Up
200	300	2 1/2
300	400	3
400	500	3 1/2
500	600	4
600	700	4 1/2
700	800	5
800	900	5 1/2
900	1,000	6

4703. FIELD EXPEDIENT ZEROING

a. General.--In many instances, known-distance ranges will be unavailable to the sniper for zeroing or rezeroing his weapon. In such cases, field expedient methods will be used to determine correct sight settings. Two methods in general use are the 900-inch and the unknown-distance method.

b. 900-Inch Method.--Figure 44 illustrates a field expedient target for zeroing the Redfield scope mounted on the model 40 sniper rifle. The sample target is designed for establishing 300-, 500-, and 750-yard zeros while firing at 900 inches (25 yards). Targets may be constructed from available material. A black bulls-eye is painted to use as an aiming point; a grey spot or a plain circle is drawn at the prescribed distance directly above it. To determine this distance, see subparagraph 4703b(3).

(1) To establish or verify the zero for any of the ranges shown in the illustration you must:

(a) Quarter the black spot with the crosshairs of the telescope.

(b) Fire a round and observe the impact of the bullet.

(c) Make the necessary adjustments on the telescope to bring the impact of the bullet into the upper circle for the particular range.

(d) Fire again and observe. Continue adjustments until several shots strike within the upper circle.

(2) The rifle is now zeroed for that range. The sniper may then apply normal come-up or come-down to establish zeros at other ranges.

(3) Similar field expedient targets

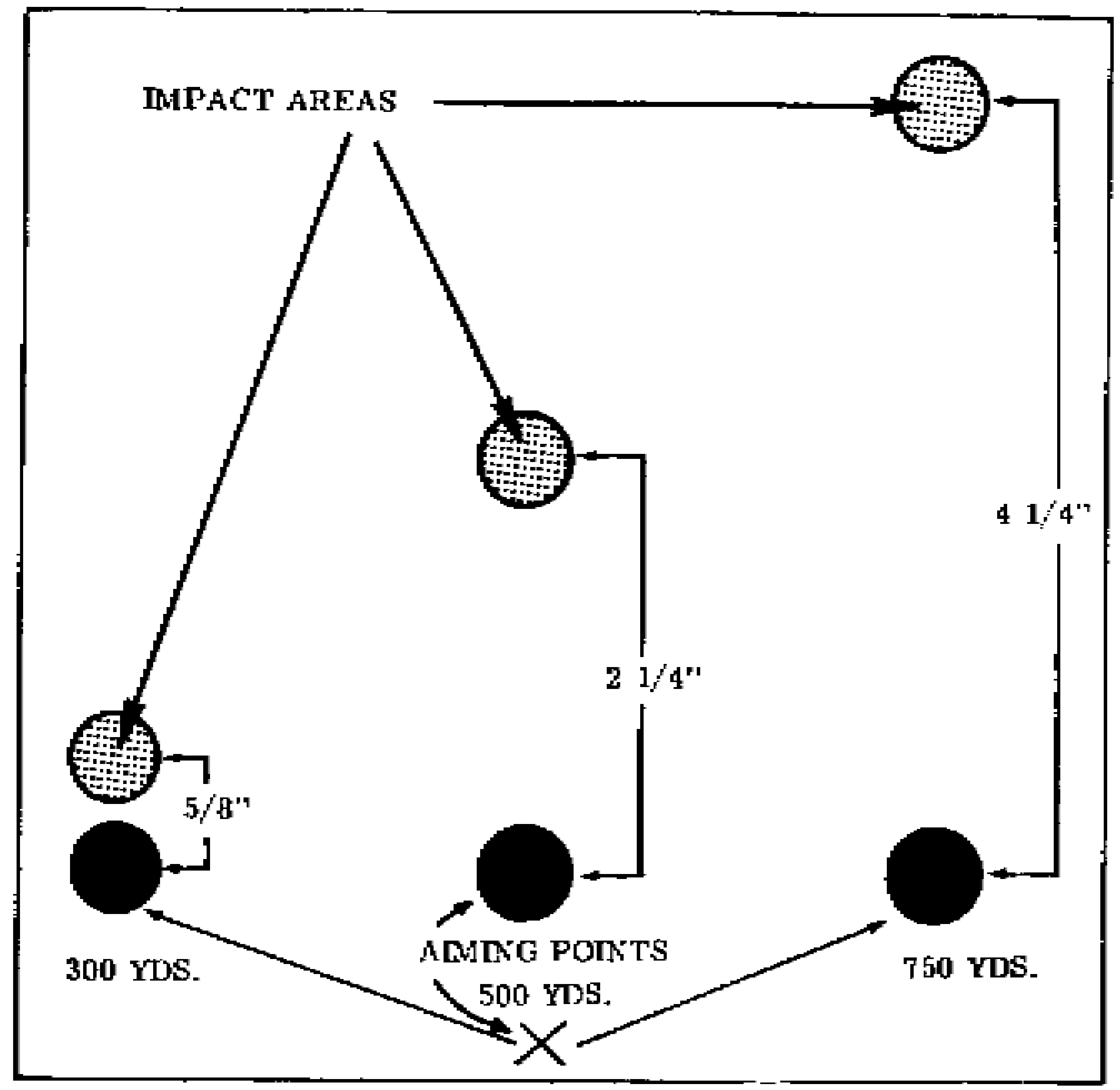


Figure 44.--900-Inch Zeroing.

may be prepared for ranges other than those in figure 44. Field expedient targets may also be produced for use with various rifle and telescope combinations of other manufacture. It is necessary in each case to arrive at the correct distance between the lower and upper bulls-eye. To accomplish this, it is necessary to:

(a) Use a rifle telescope combination for which a zero has been previously

established on a known-distance range.

(b) Using that established sight setting for that range, fire a three-shot group at 900 inches ensuring that the crosshairs are quartered on the lower bulls-eye.

(c) Measure the point of impact from the point of aim for each shot fired.

(d) Add all the measurements and divide the total by the number of shots fired to establish an average.

(e) The resulting average in inches will then be used to establish the center point for the upper bulls-eye.

c. Unknown-Distance Zeroing. --When a known-distance range is not available, the zero of a telescope can be checked or established by the following procedure:

(1) Pick out an aiming point in the center of an area where the observer can see the strike of the bullet. This can be a hillside, a brick house or stone house, or any dry surface where the strike of the bullet can be observed. The range to this target must be determined by map, from the range card of another weapon, or by measurement.

(2) Boresight the rifle, following procedure in subparagraph 4702b, and fire one shot at the aiming point.

(3) An observer notes the bullet strike and gives the elevation and windage change necessary to bring it to the point of aim. He does this by estimating the distance of the bullet strike right or left, high or low, and converts these distances to minutes of change by dividing the error in inches by the number of inches 1 minute will move the strike at the given range. Example: The sniper selects a chimney on the side of a brick house at a range of 500 yards. A point on the left side of the chimney, even with a second

story window, is his aiming point. The sniper boresights his rifle and fires one shot. The observer sees a puff of brick dust about 4 feet to the right and about 2 feet low of the aiming point. He gives these corrections: "Up 5 minutes" (25 inches at that range), and "left 10 minutes" (left 50 inches at that range). The sniper places these corrections on his sight and fires a confirming round.



CHAPTER 5

FIELD TRAINING

Section I. GENERAL

5101. PURPOSE

Field training is designed to broaden the sniper's knowledge of advanced techniques of infantry training in order that he may successfully carry out his assigned mission.

5102. SCOPE

A knowledge of the subjects covered in field training is essential to the successful completion of a sniper mission. Although these subjects are covered in separate sections for instructional purposes, they are, of course, interdependent in application. For example, upon receipt of a mission, the sniper relies on his training to dress properly,

apply camouflage, and prepare his equipment. A thorough knowledge of maps, compass, maneuver, terrain, and camouflage discipline allows him to reach the objective area without being detected. Through training, he has developed the capability of detecting and selecting targets, determining their ranges, and applying leads and holds if sight movement is not feasible. He can adjust artillery fire from concealed positions, and he is prepared to survive in, move through, and leave hostile areas by applying the principles of survival, evasion, and escape.

Section II. TARGET DETECTION

5201. GENERAL

The sniper's mission requires him to support combat operations by delivering precision fire from concealed positions to selected targets. The term "selected targets" correctly implies that the sniper is more concerned with the significance of his targets than with the number of them. In his process of target detection, he will not shoot the first one available but will index the location and identification of all the targets he can observe. He will then fire at them in descending order of their importance. The details of the maneuvers, the use of cover and concealment, and other skills by which a sniper makes his way to his position of observation will be covered in later sections. This section will discuss his observation position, capabilities, and procedures; his system for detecting and indexing target locations; and his considerations in evaluating "selective" targets.

5202. OBSERVATION POSITION

a. Nature of Position.--The sniper, having decided upon an area of observation, must choose a specific spot from which to operate. The sniper must not forget that a position which appears to him as an obvious and ideal location for a sniper will also appear as such to the enemy. He should avoid the obvious positions and stay away from prominent, readily identifiable objects and terrain features. Figure 45 shows some recommended positions. The best position represents an optimum balance between two considerations:

(1) It provides maximum fields of observation and fire to the sniper.

(2) It provides maximum concealment from enemy observation.

b. Position Safety.--Selection of a well-covered or concealed position is not a guarantee for the sniper's safety. He must remain alert to the danger of self-betrayal and must not violate the following precautions:

(1) He always assumes that his position is under observation.

(2) He avoids making any sound or unnecessary motion.

(3) He never looks over a skyline or the top of any cover which has an even outline or contrasting background.

(4) He never wears any object which might reflect light.

(5) He never uses binoculars or a telescope where light could be reflected from lenses or other parts. When optical instruments must be used and a shaded observation site is not available, the sniper can fashion a sunshade from cardboard or other available material to shield the lens from direct sunlight.

(6) He never moves the foliage when looking through bushes or hedges.

(7) He always looks around a tree from a position near the ground.

(8) He always stays in shadow when observing from a building interior.

5203. OBSERVATION CAPABILITIES AND LIMITATIONS

Observation is the keynote to a sniper's success. He must be fully aware of the human capabilities and limitations for productive observation in waning light and in darkness, and of the aids which can enhance his visual powers under those conditions.

a. Night Vision.--Night runs the gamut from absolute darkness to bright moonlight. No

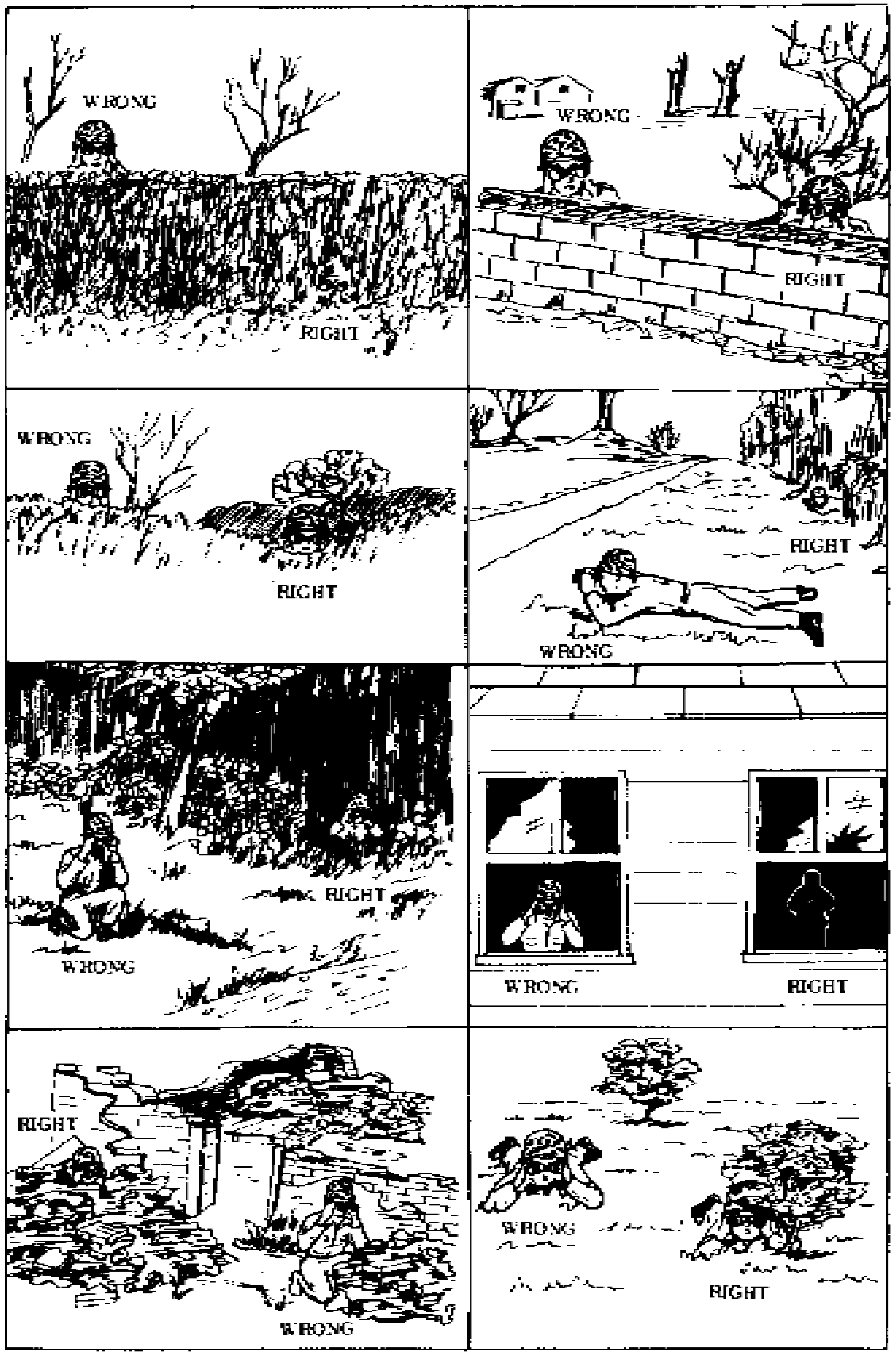


Figure 45. --Recommended Sniper Positions.

matter how bright the night may appear to be, however, it will never permit the human eye to function with daylight precision. For maximum effectiveness, the sniper must apply the proven principles of night vision.

(1) Darkness Adaptation. --It takes the eye about 30 minutes to regulate itself to a marked lowering of illumination. During that time, the pupils are expanding and the eyes are not reliable. The use of red goggles will assist the eyes in adapting to the approach of darkness. In instances when the sniper is to depart on a mission during darkness, it is recommended that he wear red glasses while in lighted areas prior to his departure.

(2) Off-Center vs Direct Vision. --(See figs. 46 and 47.) Off-center vision is the technique of focusing attention on an object without looking directly at it. An object under direct gaze in dim light will blur and appear to change shape, fade, and reappear in still another form. If the eyes are focused at different points around the object and about 6 to 10 degrees away from it, side vision will provide a true picture of the object.

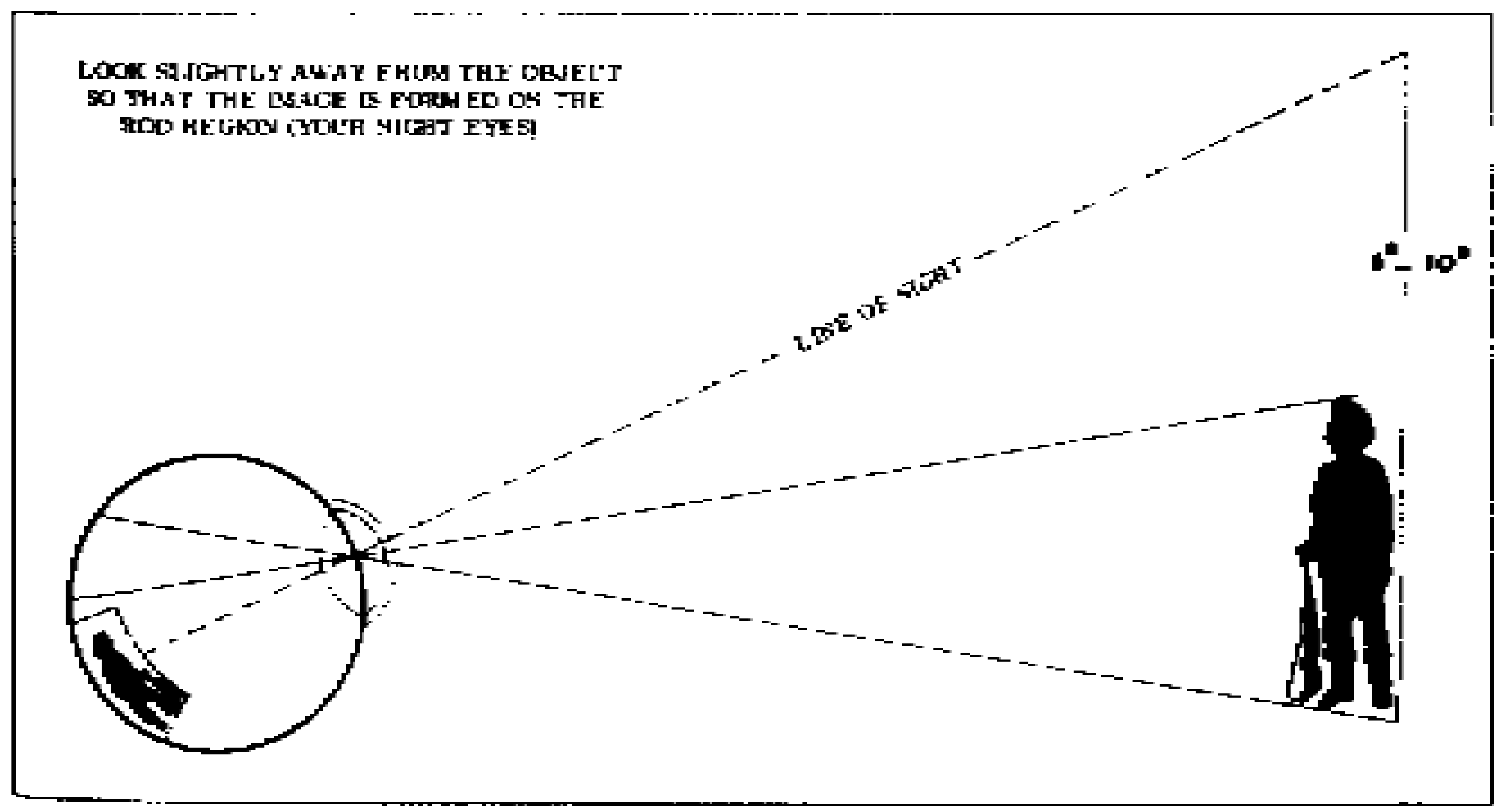


Figure 46. --Off-Center Vision.

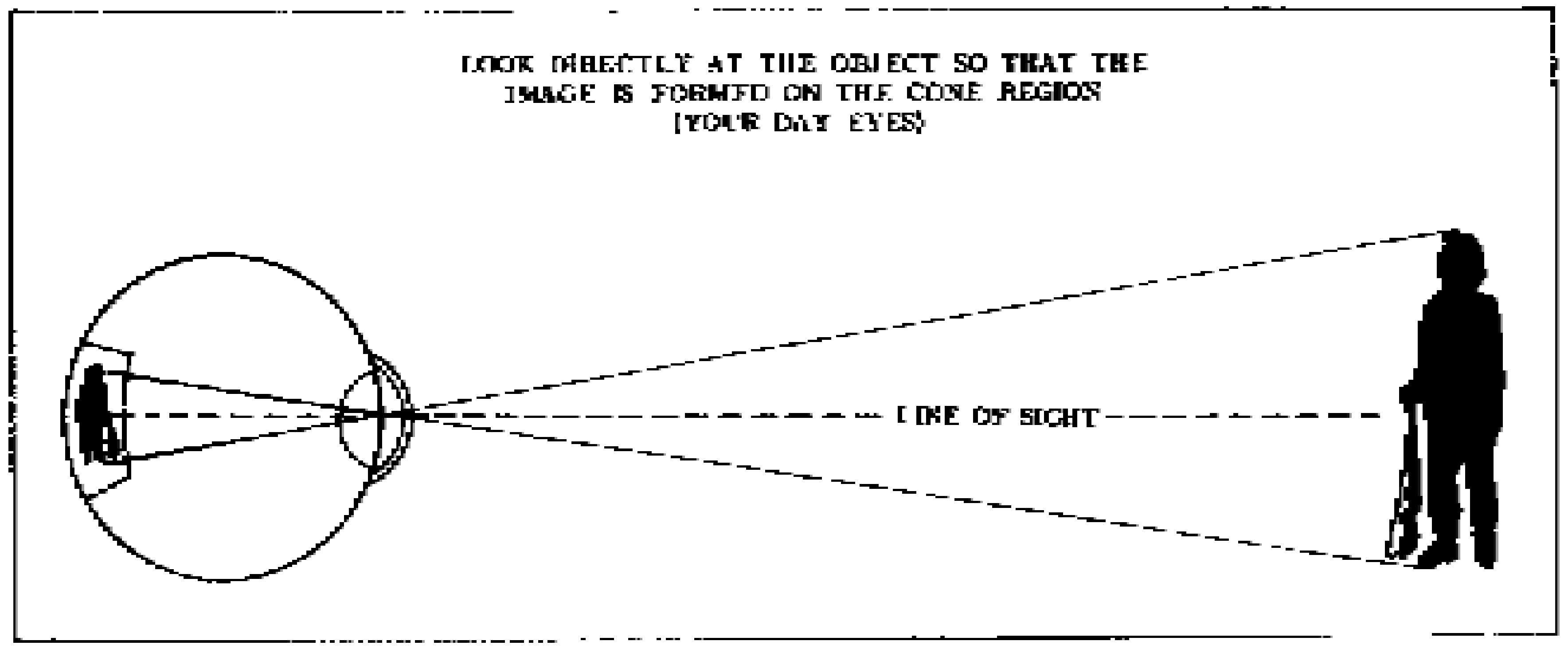


Figure 47. --Direct Vision.

(3) Scanning. --Scanning is the act of moving the eyes in short, abrupt, irregular changes of focus around the object of interest. The eye must stop momentarily at each point, of course, since it cannot see while moving.

(4) Factors Affecting Night Vision

(a) Lack of vitamin A impairs night vision. (Overdoses of vitamin A will not improve night vision, however.)

(b) Colds, headache, fatigue, narcotics, heavy smoking, and alcohol excess all reduce night vision.

(c) Exposure to a bright light impairs night vision and necessitates a readaptation to darkness.

(d) Darkness blots out detail. The sniper must learn to recognize objects and persons from outline alone.

b. Twilight. --During dawn and dusk, the constantly changing natural light level causes an equally constant process of eye adjustment. During these periods, the sniper must be especially alert to the treachery of half light and shadow. Twilight induces a false sense of security, and the sniper must be doubly careful for his own safety. For the

same reason, the enemy is prone to carelessness and will frequently expose himself to the watchful sniper. The crosshairs of the telescope are visible from about 1/2 hour prior to sunrise until about 1/2 hour after sunset.

c. Illumination Aids. --On occasion, the sniper may have the assistance of artificial illumination for observation and firing. As examples:

(1) Cartridge, Illuminating, M301A2. --Fired from an 81mm mortar, this shell produces 50,000 candlepower of light which is sufficient for the use of the binoculars, the M49 telescope, or the rifle telescope.

(2) Searchlights. --In an area illuminated by searchlight, the sniper can use any of the above equipment with excellent advantage.

(3) Other. --Enemy campfires or lighted areas and buildings are other aids to the observing sniper.

d. Night Observation Aids

(1) Binoculars. --Of the night observation aids, binoculars are the simplest and fastest to use. They are easily manipulated and the scope of coverage is limited only by the sniper's scanning ability.

(2) Redfield 3x9 Variable Rifle Telescope. --When equipped with the Redfield telescope, the sniper can observe up to 800 meters with varying effectiveness in artificial illumination. In full moonlight, it is effective to 600 meters. For best results, a supported position should be used. The power of the telescope may be adjusted to the situation. However, the lower the power, the greater is the light-gathering quality of the scope. Optional power adjustments are as follows:

(a) 3 to 5 Power (Low). --This power gives a wide field of view, but the objects viewed will appear small. Visibility is good to 600 meters, and the crosshairs and range scale are

well defined.

(b) 6 and 7 Power (Medium).--This offers the best observation character. Field of view is reduced, but objects are more discernible and clarity is increased. Crosshairs, range scale, and reference wire are clear enough for shooting.

(c) 8 and 9 Power (High).--At high power, the field of view is more reduced and scanning clarity is impaired. High power can be used to distinguish specific objects, but scanning will lend a flat, unfocused appearance to terrain.

(3) Starlight Scope.--The Starlight Scope is discussed in chapter 3.

e. Considerations in the Use of Night Visual Aids

(1) Open ground and approaches bordering tree and brush lines allow optimum observation, but thick cover and tall trees will block out artificial light.

(2) Drifting flares afford clear visibility for a very short time. Shadows move with the light and targets are quickly obscured.

(3) Illumination will not often expose a well-camouflaged position, but it will permit detection of movement.

(4) Erratic patterns of artificial light can betray the sniper by reflections from his observation devices.

5204. OBSERVATION PROCEDURES

a. General.--The sniper, having settled into the best obtainable position, is ready to search his chosen area. The process of observation is planned and systematic. His first consideration is towards the discovery of any immediate danger to himself, so he begins with a "hasty search" of the entire area. This is followed by a slow, deliberate observation which he calls a "detailed search." Then, as long as he remains in position, the sniper maintains a constant observation of the area using the hasty and detailed search methods as occasion requires.

b. Hasty Search.--This is a very rapid check for enemy activity and is conducted in about 30 seconds. The search is carried out by making quick glances at specific points throughout the area; not by a sweep of the eyes across the terrain in one continuous panoramic view. The hasty search is effective because the eyes are sensitive to any slight movements occurring within a wide arc of the object upon which they are focused. This faculty is called "side vision" or "seeing out of the corner of the eye." The eyes must be focused on a specific point in order to have this sensitivity.

c. Detailed Search

(1) If the sniper fails to locate the enemy during the hasty search, he must then begin a systematic examination known as the 50-meter overlapping strip method of search. (See fig. 48.) Normally, the area nearest the sniper offers the greatest potential danger to him. Therefore, the search should begin with the terrain nearest the observer's position. Beginning at either flank, the sniper should systematically search the terrain to his front in a 180-degree arc, 50 meters in depth. After reaching the opposite flank, the sniper should search the next area nearest his position. This search should cover the terrain located between approximately 40 and 90 meters of his position. The second search of the terrain includes about 10 meters of the area examined during the first search. This technique ensures complete coverage of the area. The sniper continues searching from one flank to the other in 50-meter overlapping strips as far out as he can see.

(2) To again take advantage of his side vision, the sniper should focus his eyes on specific points as he searches from one flank to the other. He should make mental notes of prominent terrain

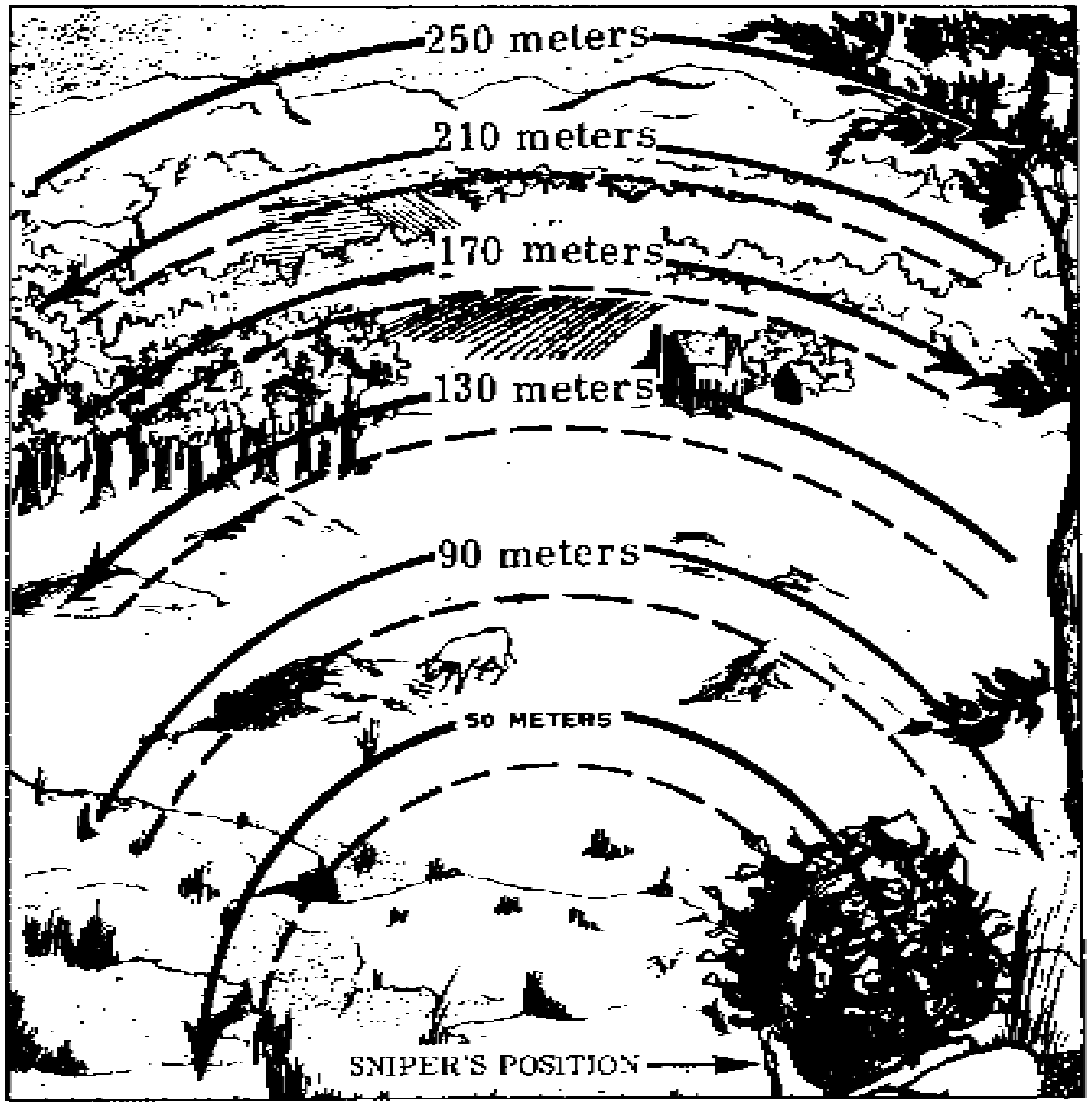


Figure 48. --Searching the Terrain in Overlapping Strips.

features and areas that may offer cover and/or concealment to the enemy. In this way, he becomes familiar with the terrain as he searches it.

d. Maintaining Observation

(1) Method. --After completing his detailed search, the sniper may be required to maintain observation of the area. To do this, he should use a method similar to his hasty search of the

area. That is, he uses quick glances at various points throughout the entire area, focusing his eyes on specific features.

(2) Sequence. --In maintaining observation of the area, he should devise a set sequence of searching to ensure coverage of all terrain. Since it is entirely possible that this hasty search may fail to detect the initial movement of an enemy, the observer should periodically repeat a detailed search. A detailed search should also be conducted anytime the attention of the observer is distracted.

5205. TARGET EVIDENCE

Target evidence is any sign which can enable a sniper to detect the location of an enemy, his installations, or his equipment. Conversely, the sniper can betray himself by providing target evidence of his own presence. Indicators are grouped into the three general areas of sound, movement, and improper camouflage and are discussed in section VI, chapter 5.

5206. INDEXING TARGET LOCATIONS

a. Purpose. --There are several reasons why the sniper must have some system for remembering or indexing target locations as he detects them.

(1) He desires to shoot first at the most "selective" target available.

(2) Indiscriminate firing at a first target may alert more valuable and closer targets.

(3) Concentration on a distant target may result in disclosure of his position to a closer enemy.

(4) He may sight several targets at the same time and he will need to remember all their locations while he determines which to engage first.

b. Techniques.--To remember the locations of targets, the sniper uses aiming points and reference points. An aiming point is some feature directly on line between the sniper and the target. For example, if an enemy moves into a concealed position behind a bush, the sniper selects a point of aim on the bush. If the enemy moves into a concealed position which has no distinguishing feature in front of it, the sniper selects some nearby reference point and notes its direction and distance from the point at which the enemy disappeared.

c. Considerations

(1) Exposure Time.--Moving targets may expose themselves for only a short time. The sniper must be very alert to note the points of disappearance of as many as possible before he engages any one of them. By so doing, he will be able to take several of them under fire in rapid succession.

(2) Number of Targets.--When the number of targets is such that the sniper is unable to remember all locations, he must concentrate on the most prominent among them lest he become confused and fail to effectively locate any at all.

(3) Spacing.--The greater the space interval between targets, the more difficult it is to note their movements. In such case, the sniper should accurately locate the one nearest his position and note only the general locations of the others.

(4) Evaluating Aiming Points.--Targets which disappear behind good aiming points are easily remembered. Targets with poor aiming points are easily lost. Assuming that two such targets are of equal value or are equally dangerous to the sniper, he should engage the poor aiming point first.

5207. TARGET SELECTION

a. General.--The sniper selects targets according to their value. Certain enemy personnel

and equipment can be justifiably listed as key targets, but their real worth must be decided by the sniper in relation to the circumstances in which he locates them.

b. Key Targets

(1) Officers.--Officers of many armies can be distinguished by plainly visible rank insignia which also provide good aiming points. Officers may wear uniforms differing from those of their troops in material, cut, and color. They may carry binoculars, pistols, swords, or map cases, and they may use arm-and-hand signals and communication equipment. During a march, they may occupy random positions, or they may ride in lead vehicles or staff cars.

(2) Noncommissioned Officers.--NCOs may be identified by their stripes and their general actions in leading and directing troops.

(3) Scouts.--Scouts may be identified by the mode of their employment. They are natural enemies of the sniper since they can stalk him on equal terms.

(4) Crew-Served Weapons' Gunners.--They may be identified by their proximity to the weapon or its position.

(5) Tank Commanders.--They may be identified by their position on or in the turret.

(6) Recruits.--"Green" troops may be identified by their lack of caution. If several of them are hit, others may panic and run.

(7) Communication Personnel.--They may be identified by their equipment and employment. The sniper may lay a productive ambush by cutting wires and waiting for the repairmen. If messengers are intercepted and shot, they should be searched if at all possible.

(8) Snipers.--They may be identified by the manner of their employment or their possession of telescope-mounted rifles, although many snipers are armed with iron sight rifles. Snipers

are difficult to locate and are usually not seen until they have violated a "target indicator" principle or have fired their weapon.

(9) Observers.--They may be identified by their use of optical equipment.

c. Considerations in Target Selection.--As implied in the discussion of indexing targets (see par. 5206), the sniper's choice of targets may sometimes be forced on him. He may lose a rapidly moving target if he waits to identify it in detail; and he must, of course, consider any enemy who threatens his position as a "very high value" target. When he is able to make free choice, however, the sniper will consider several factors:

(1) Distance.--Although he is capable of hitting a human at a range of 1,000 meters, the sniper should not risk such a distant shot without special reason.

(2) Multiple Targets.--The sniper should carefully weigh the possible consequence of shooting at one of a number of targets especially when he cannot identify them in detail. He may trade his life for an inconsequential target by putting himself in a position where he has to fire repeatedly in self-defense.

(3) Equipment as Targets.--A well-placed shot can disable crew-served weapons, radios, vehicles, and other equipment. Such equipment, however, may serve as "bait" and allow the sniper to make repeated kills of gunners and operators while keeping the equipment idle at the same time. The equipment can be disabled at the sniper's later decision.

(4) Intelligence Collection.--Intelligence collection is an important colateral function of the sniper. When in location close to the enemy, he must be very judicious in his decision to open fire. He may interrupt a pattern of activity which, if observed longer, would allow him to report facts

which would far outweigh the value of his kill. The kill could be made a short time later. The well-trained sniper will sensibly evaluate such situations.

Section III. RANGE ESTIMATION

5301. GENERAL

Range estimation is simply the process of determining the distance between two points. In most situations, one of these points will be the observer's own position. The other point may be a target or prominent feature on the terrain. THE ABILITY TO ACCURATELY DETERMINE RANGE IS A KEY SKILL WHICH MUST BE DEVELOPED BY THE SNIPER TO ACCOMPLISH HIS MISSION. Not only does the accurate determination of range affect his sniping proficiency, but it is also necessary in reporting information accurately and adjusting artillery and mortar fire effectively.

5302. RANGE ESTIMATING METHODS

There are a number of methods for estimating range: measuring distances on maps, pacing the distance between two points, using a range card, using an optical range finder, observing the impact of a round fired at the point in question, and estimation by eye. The sniper rarely has access to an optical range finder. Pacing the distance between two points is a method that can be used, provided the enemy is not in the vicinity. Firing a round at the target area or an object at the same range, yet remote from the target, to determine range can reveal the sniper's position to the enemy. There are, however, circumstances under which this method can be used effectively; i.e., during periods when other units in the vicinity of the sniper team are also engaged in firing or when other battlefield noises would distract the attention of the enemy. The sniper's training must concentrate on methods which are adaptable to the sniper's equipment and which will not expose the

sniper. Among the methods of estimating range which meet these requirements are the use of maps, the 100-meter unit of measure method, the appearance-of-objects method, bracketing method, team average method, and the range card method.

a. Use of Maps. --When available, maps are the most accurate aid in determining range. Knowledge of mapreading is as important to the sniper as familiarity with his rifle.

b. 100-Meter Unit of Measure Method. --This is the most frequently used method of determining ranges within rifle limitations.

(1) Techniques. -- To use this method, the sniper must be able to visualize a distance of 100 meters on the ground. For ranges up to 500 meters, he determines the number of 100-meter

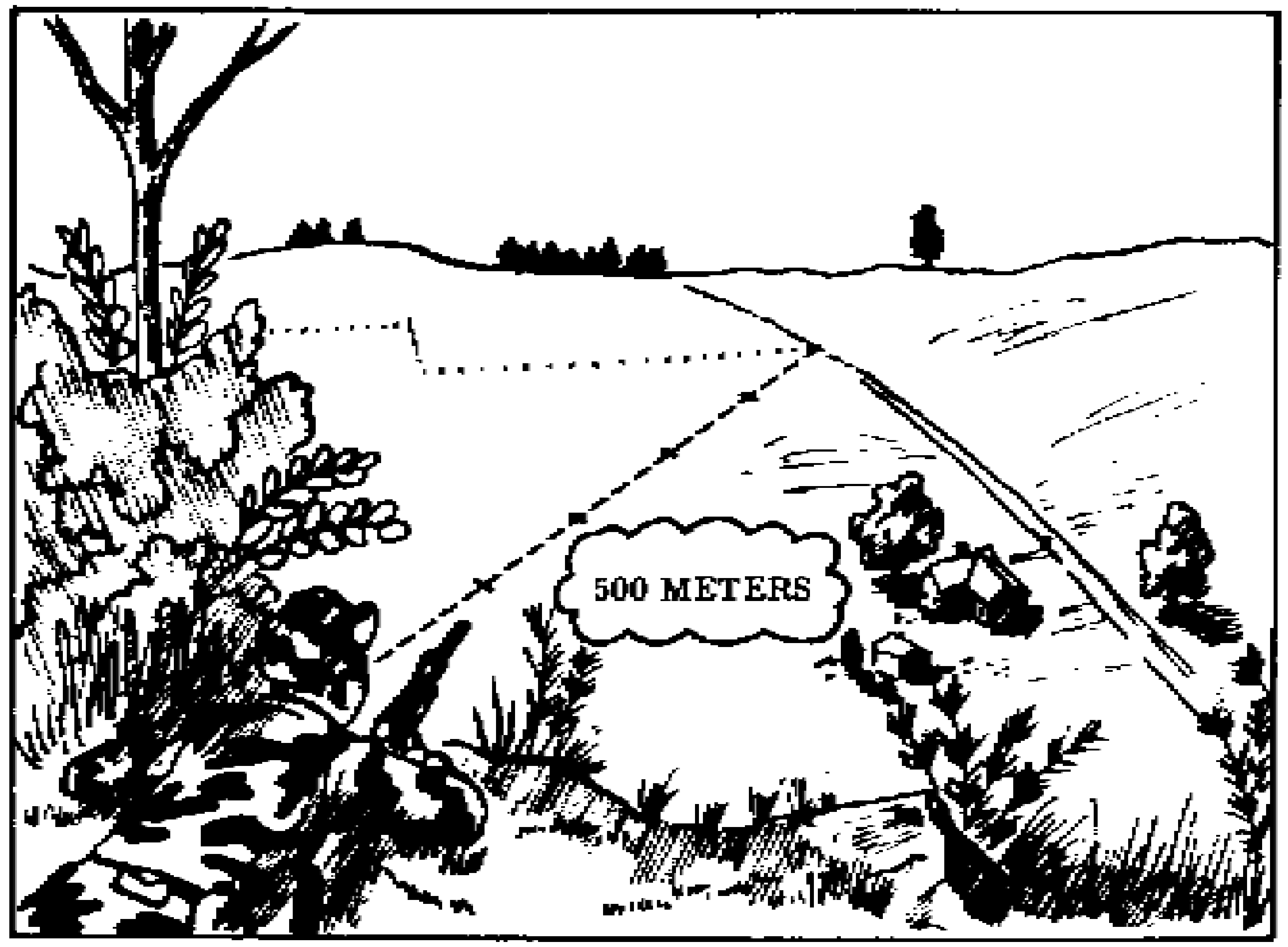


Figure 49. --100-Meter Unit of Measure; Ranges to 500 Meters.

increments between the two points he wishes to measure. (See fig. 49.) Beyond 500 meters, he selects a point midway to the target, determines the number of 100-meter increments to the halfway point, and doubles the result. (See fig. 50.)

(2) Effect of Sloping Terrain. --Ground which slopes upward gives the illusion of greater distance, and observers tend to overestimate a 100-meter increment. That is, they may select two points as being 100 meters apart when, in fact, they are less than 100 meters apart. Conversely, ground sloping downward gives an illusion of shorter than actual distance, and the observer tends to underestimate. He applies a 100-meter unit of measurement between two points which are actually 140 or 150 meters apart.

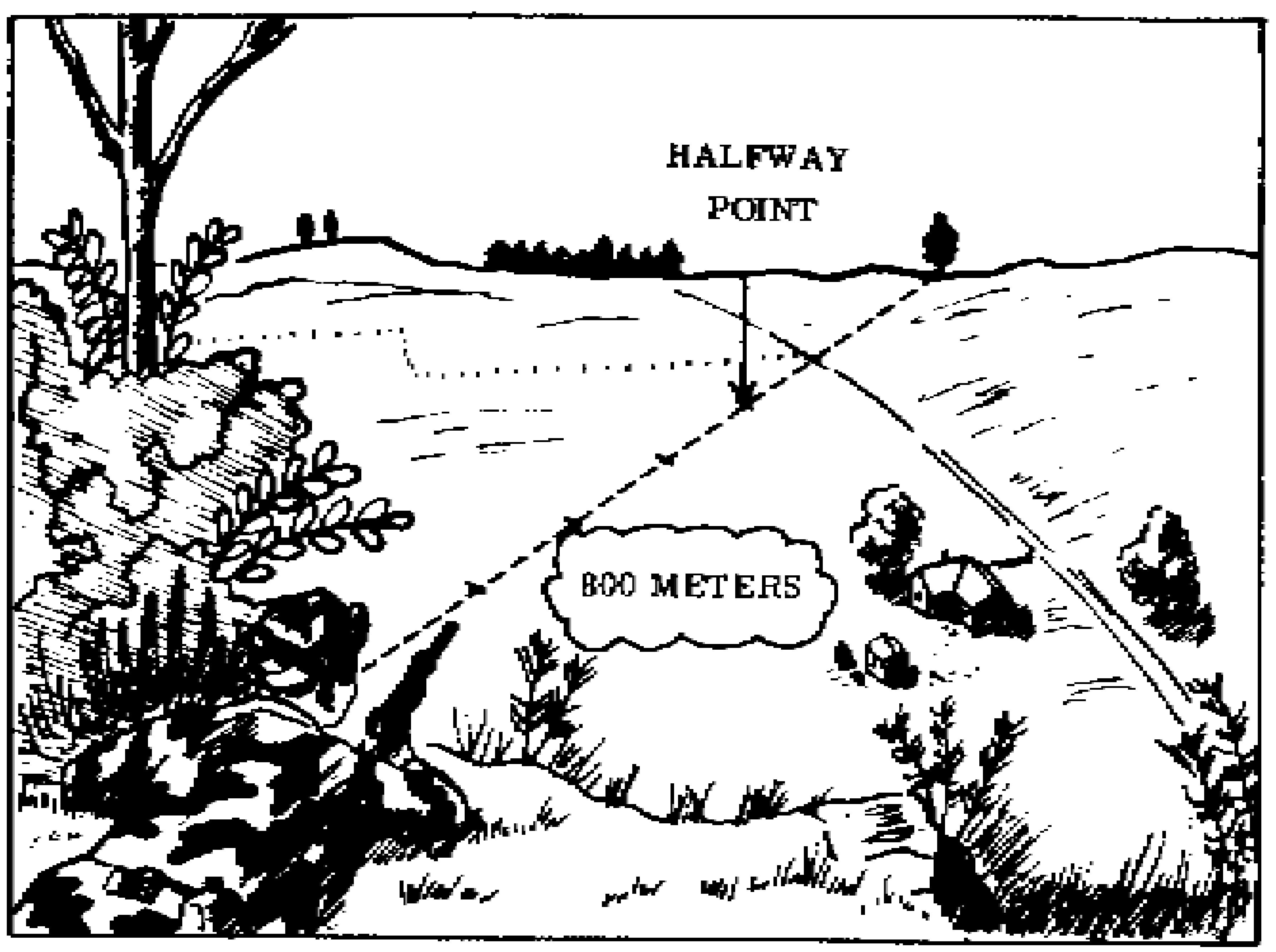


Figure 50. --100-Meter Unit of Measure; Ranges Greater Than 500 Meters.

(3) Attaining Proficiency. --With practice, the sniper will become expert at estimating range by the 100-meter method. He must measure off several 100-meter courses, each on different terrain, and then, by walking over these courses several times, determine the average number of paces which he requires to cover 100 meters on the various terrains. He can then practice estimation by walking over unmeasured terrain, counting his paces, and marking off 100-meter increments. Looking over his back trail, he can study the appearances of the successive increments. Conversely, he can estimate distance to a given point, walk to it, counting his paces, and thus check his accuracy.

(4) Limitations. --The greatest limitation of the 100-meter unit of measure is that its accuracy is directly related to how much of the terrain is visible to the observer. This is particularly important in estimating long ranges. If a target appears at a range of 100 meters or more and the observer can only see a portion of the ground between himself and the target, the 100-meter unit of measure method of range determination cannot be used with any degree of accuracy.

c. Appearance-of-Objects Method

(1) Techniques. --The appearance-of-objects method is a means of determining range by the size and other characteristic details of some object. For example, a motorist attempting to pass another car must estimate the distance of oncoming vehicles based on his knowledge of how vehicles appear at various distances. Of course, in this example, the motorist is not interested in precise distances, but only that he has sufficient road space to safely pass the car in front of him. Suppose, however, the motorist knew that at a distance of 1 kilometer an oncoming vehicle appeared to be 2.54 centimeters (1 inch) wide and 5.08 centimeters (2 inches) high, with about 1.27 centimeters (1/2

inch) between the headlights. Then, anytime he saw oncoming vehicles which fitted these dimensions, he would know they were about one kilometer away. This same technique can be used by snipers to determine ranges. Aware of the sizes and details of personnel and equipment at known ranges, he can compare these characteristics to similar objects at unknown distances and thus estimate the range.

(2) Attaining Proficiency.--To use the appearance-of-object method with any degree of accuracy, the sniper must be thoroughly familiar with the characteristic details of objects as they appear at various ranges. For example, the sniper should study the appearance of a man at a range of 100 meters. He fixes the man's appearance firmly in his mind, carefully noting details of size and the characteristics of uniform and equipment. Next, he studies the same man in a kneeling position and then in a prone position. By comparing the appearance of these positions at known ranges from 100 to 500 meters, the sniper can establish a series of mental images which will help him determine ranges on unfamiliar terrain. Training should also be conducted in the appearance of other familiar objects such as weapons and vehicles.

(3) Limitations.--Because the successful use of this method depends upon the visibility, anything which limits the visibility, such as weather, smoke, or darkness, will also limit the effectiveness of this method. (See fig. 51.)

d. Combination of Methods.--Under proper conditions, either the 100-meter unit of measure or the appearance-of-objects method is an effective way of determining range; however, proper conditions rarely exist on the battlefield. Consequently, the sniper will be required to use a combination of methods. Terrain can limit the accuracy of the 100-meter unit of measure method and the visibility can limit the appearance-of-objects method. For example, an observer may not be able to see all

FACTORS TO BE CONSIDERED IN DETERMINING RANGE BY EYE	OBJECTS APPEAR NEARER THAN THEY REALLY ARE	OBJECTS APPEAR MORE DISTANT THAN THEY REALLY ARE
THE TARGET—ITS CLEARNESS OF OUTLINE AND DETAILS	WHEN MOST OF THE TARGET IS VISIBLE AND OFFERS A CLEAR OUTLINE	WHEN ONLY A SMALL PART OF THE TARGET MAY BE SEEN OR IS SMALL IN RELATION TO ITS SURROUNDINGS
NATURE OF THE TERRAIN OR POSITION OF THE OBSERVER	WHEN LOOKING ACROSS A DEPRESSION, MOST OF WHICH IS HIDDEN FROM VIEW WHEN LOOKING DOWNWARD FROM HIGH GROUND WHEN LOOKING DOWN A STRAIGHT, OPEN ROAD OR ALONG A RAILROAD TRACK	WHEN LOOKING ACROSS A DEPRESSION, ALL OF WHICH IS VISIBLE WHEN LOOKING FROM LOW GROUND TOWARD HIGH GROUND WHEN FIELD OF VISION IS NARROWLY CONFINED AS IN TWISTED STREETS, DRAWS, OR FOREST TRAILS
LIGHT AND ATMOSPHERE	WHEN LOOKING OVER UNIFORM SURFACES LIKE WATER, SNOW, DESERT, OR GRAIN FIELDS IN BRIGHT LIGHT OR WHEN THE SUN IS SHINING FROM BEHIND THE OBSERVER WHEN THE TARGET IS IN SHARP CONTRAST WITH THE BACKGROUND OR IS SILHOUETTED BY REASON OF SIZE, SHAPE, OR COLOR WHEN SEEN IN THE CLEAR ATMOSPHERE OF HIGH ALTITUDES	IN POOR LIGHT SUCH AS DAWN AND DUSK, IN RAIN, SNOW, OR FOG, OR WHEN THE SUN IS IN THE OBSERVER'S EYES WHEN THE TARGET BLENDS INTO THE BACKGROUND OR TERRAIN

Figure 51.--Factors Affecting the Appearance of Objects.

of the terrain out to the target, but he may see enough to get a fair idea of the distance. A slight haze may obscure many of the target details, but the observer can still make some judgment of its size. Thus, by carefully considering the results of both methods, an experienced observer should arrive at a figure close to the true range.

e. Bracketing Method.--By this method the sniper assumes that the target is no more than "X" meters, but no less than "Y" meters away; he uses the average as the estimation of range. The bracket width should increase with target distance.

f. Average Method.--Snipers can increase the accuracy of range estimation by eye by using an average of the individual team members' estimations.

g. Range Card Method.--(See fig. 22.) Information contained on prepared range cards establishes reference points from which the sniper can judge ranges rapidly and accurately. When a target appears, its position is determined in relation to the nearest object or terrain feature drawn on the range card. This will give an approximation

of the target's range. The sniper determines the difference in range between reference point and target and sets his sights for the proper range or uses the correct holdoff.

5303. FACTORS AFFECTING RANGE ESTIMATION

In estimating range, the sniper must consider the nature of the target, nature of the terrain, and light conditions.

a. Nature of Target

(1) An object of regular outline, such as a house, will appear closer than one of irregular outline, such as a clump of trees.

(2) A target which contrasts with its backbround will appear to be closer than it actually is.

(3) A partially exposed target will appear more distant than it actually is.

b. Nature of Terrain. --The observer's eye follows the irregularities of terrain conformation, and he will tend to overestimate distance values. In observing over smooth terrain such as sand, water, or snow, his tendency is to underestimate.

c. Light Conditions. --The more clearly a target can be seen, the closer it appears. A target in full sunlight appears to be closer than the same target when viewed at dusk or dawn, through smoke, fog, or rain. The position of the sun in relation to the target also affects the apparent range. When the sun is behind the viewer, the target appears to be close. When the sun is behind the target, the target is more difficult to see and appears farther away.

5304. OBSERVING AND ADJUSTING FIRE

Snipers, through practice, experience, and the use of range cards, are able to determine range

correctly; however, occasions will arise when an adjustment of sniper fire becomes necessary. This requires application of the shooter/observer method of firing and is accomplished in the following manner:

a. Elevation. --With the firing member in position, the observer assumes a vantage point slightly behind and to the right from where he will have an unobstructed view of the field from muzzle to target. Using binoculars, he fixes his focus at a point equal to the anticipated trajectory above the intended impact area and holds this focus until a round is fired. He will detect a disturbance of the air along the path of the bullet. This disturbance appears to be a vapor trail and is detectable for approximately the last two-thirds of the distance to the target. The trail is visible from a fraction of a second at short ranges to approximately 1 second at 1,000 yards. The wake will be most prominent at the highest point of trajectory. From his study of trajectories, the observer will be able to determine if the bullet wake coincides with the anticipated trajectory to the target. If not, an elevation or windage correction is in order.

b. Windage. --Windage adjustments are made in the same manner. What appears to be a lateral trajectory is in reality wind effect on the bullet. This will show the amount of correction necessary to compensate for error.

Section IV. HOLDS AND LEADS

5401. GENERAL

Holds and leads are advanced techniques of marksmanship that enable the sniper to hit his target without holding his sights directly on the target.

5402. HOLDS

a. General.--Holding for elevation or wind are techniques used only when the sniper does not have time to change his sight setting. Pinpoint accuracy is rarely achieved when holding since a minor error in range determination or lack of a precise aiming point might cause the bullet to miss the desired point; however, a hit anywhere on the body is normally disabling so a small error is acceptable in combat.

b. Holdoff.--Holdoff is the procedure used to hit a target at ranges other than the range for which the rifle is zeroed. When aiming directly at a target at greater ranges than the zero range, the bullet will hit below the point of aim; and at lesser ranges, the bullet will hit higher than the point of aim. Understanding this, and with a knowledge of trajectory and bullet drop, the sniper will be able to

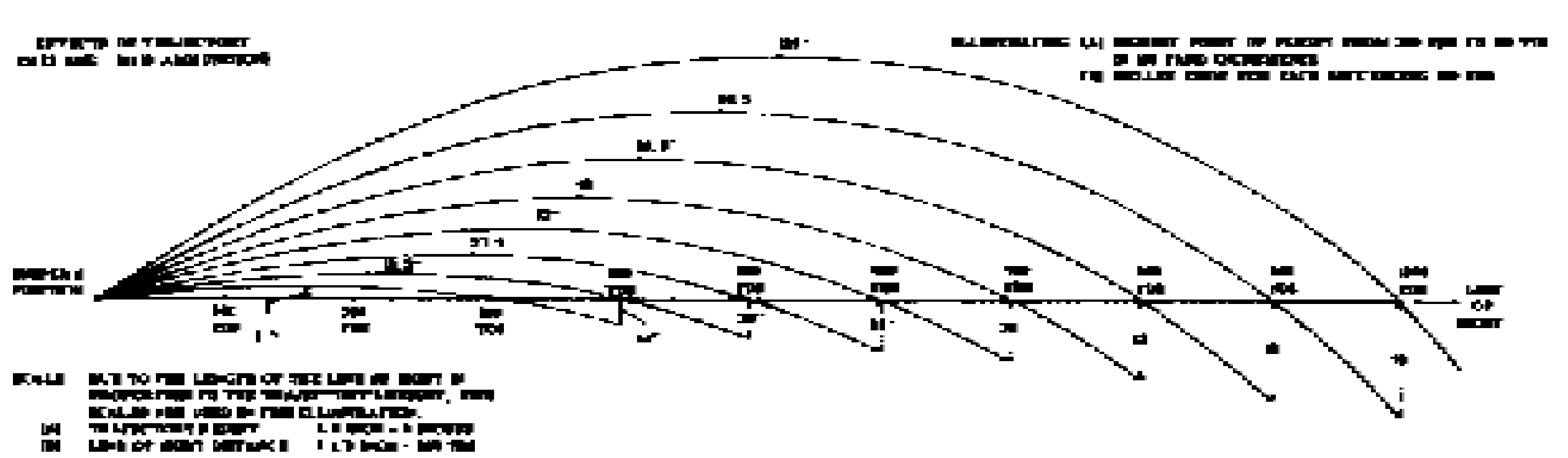


Figure 52.--Trajectory and Bullet Drop.

hit the target at ranges other than that for which the rifle was zeroed. Figure 52 illustrates trajectories for various ranges and the bullet drop for 100 yards past the ranges. For combat firing, the sniper normally has a 500-meter zero which he keeps on his rifle. With this setting, he can engage targets up to 600 meters by holding over the target. With

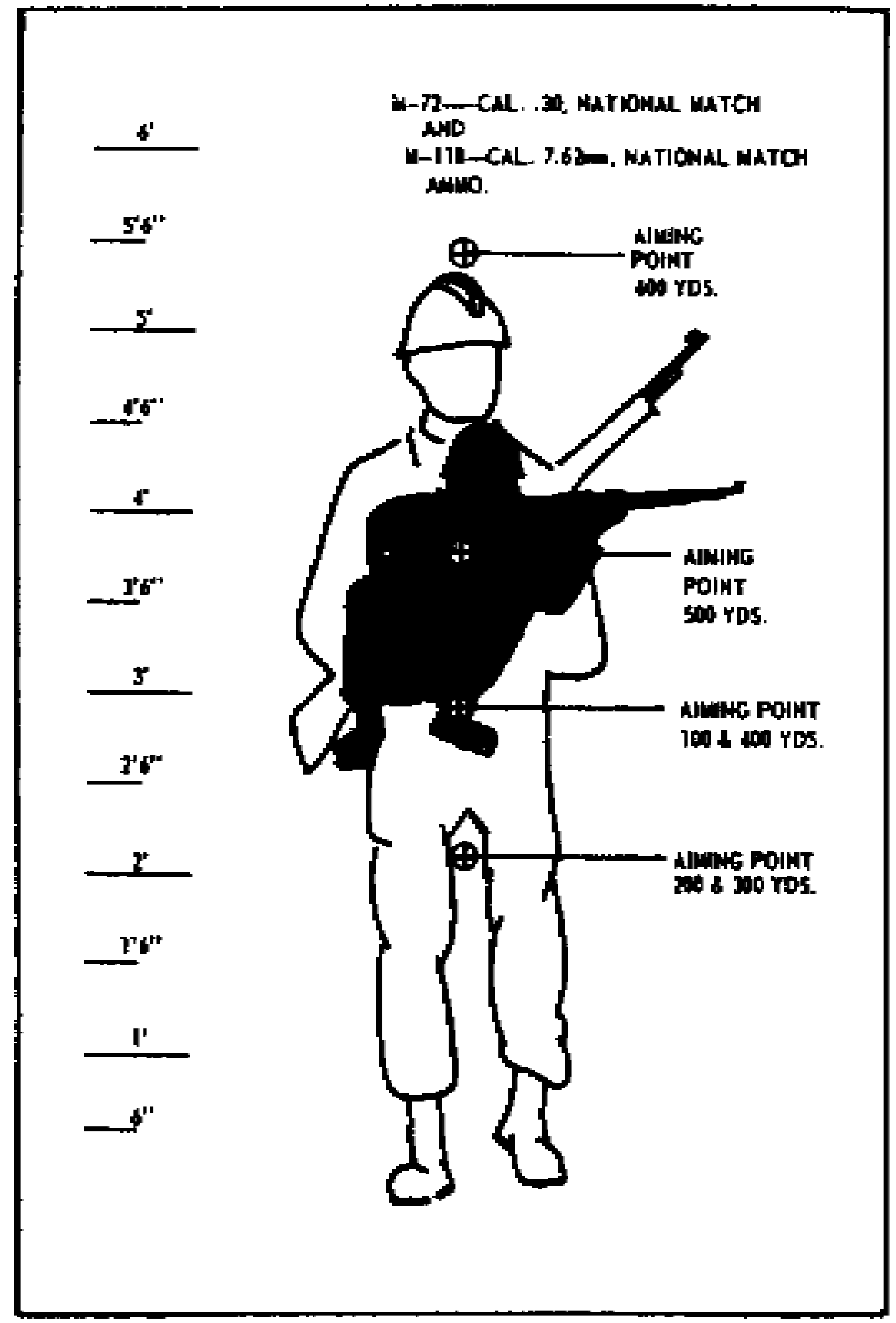


Figure 53. --Correct Holds for Various Ranges With Sights Set for 500 Meters.

targets at ranges less than 500 meters, he holds under the target. Figure 53 shows the correct holds for various ranges when the sights are set for a 500-meter zero.

c. Holding for Wind. --The sniper may use holdoff to compensate for the effect of wind. The chart in appendix F illustrates the effect of wind on the bullet in inches. It also indicates the necessary sight setting required to compensate for these wind effects, providing the sniper has time to make such adjustments. The sniper holds off for wind by aiming into it; if the wind is from the right, he aims to the right of his target the required distance; if the wind is from the left, he aims to the left. Adjustments for wind are always based on an estimate of its velocity. Constant practice in wind estimation can bring about proficiency in making sight adjustments or learning to hold off correctly. If a miss is fired and the impact of the round is observed, the sniper will note the lateral distance of his error and refire, holding off that distance in the opposite direction.

5403. LEADS

Moving targets are the most difficult to hit. When engaging a target which is moving laterally across his line of sight, the sniper must concentrate on moving his weapon with the target while aiming at a point approximately 4 inches ahead of the target at 300 yards and 8 inches ahead at 500 yards. Holding this lead, the sniper fires and follows through with the movement after the shot. Using this method, the sniper reduces the possibility of missing should the enemy suddenly stop, hit the deck, or change direction. The sniper must not only estimate his target range but also its speed and angle of travel relative to his line of sight in order to determine the correct lead.

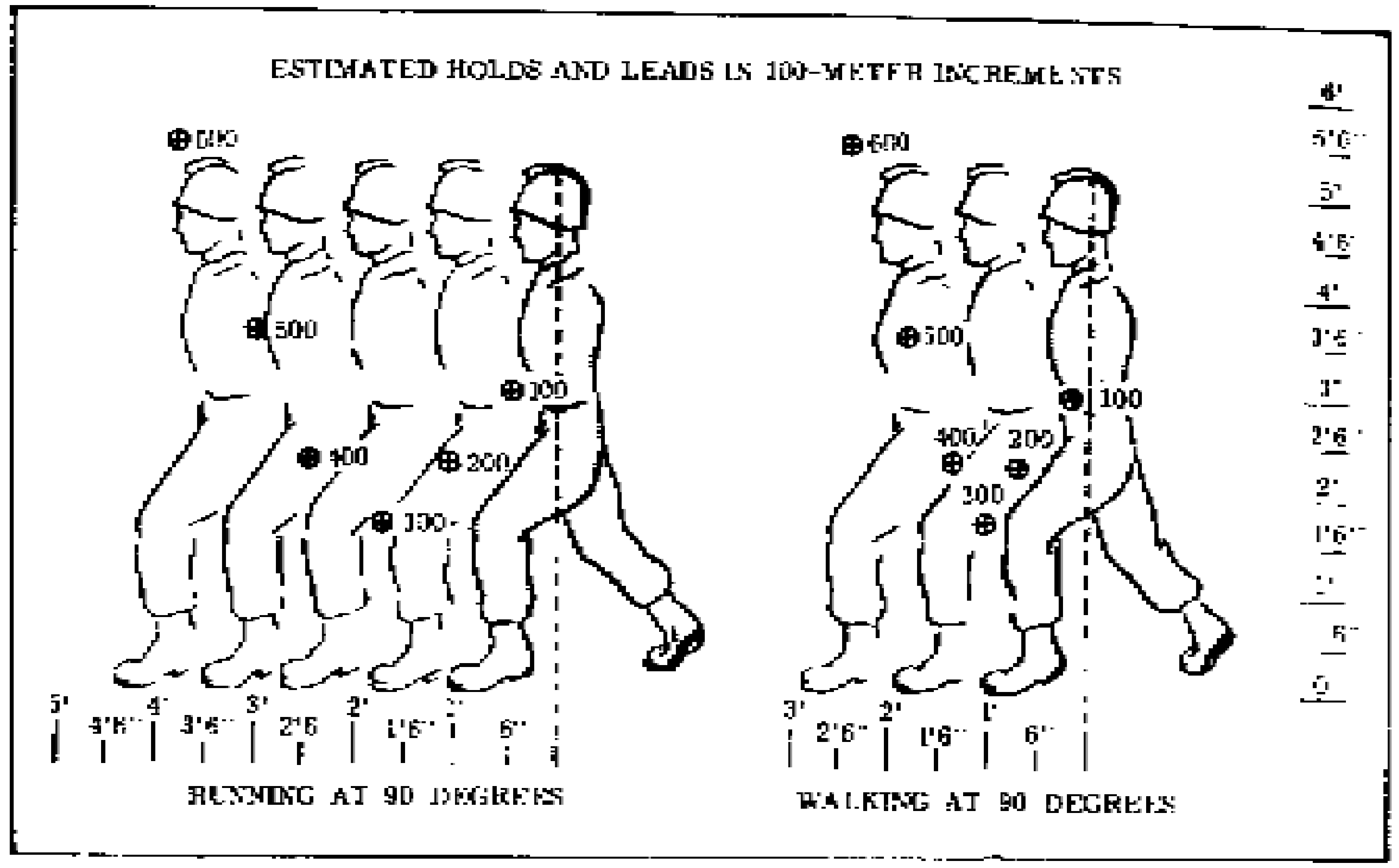


Figure 54. --Leads and Holds at 90 Degrees With Sights Set for 500 Meters.

b. Angle of Target Movement. --Figure 54 shows the leads and holds required for a target moving at a 90-degree angle to the sniper. In most cases, however, targets will be moving at some other angle toward or away from the sniper's position. A method for estimating the angle of movement is as follows:

(1) Full Lead Target. --When the target is moving across the observer's front and only one arm and one side are visible (see fig. 55), the target is moving at or near an angle of 90 degrees and a full value lead is necessary.

(2) Half Lead Target. --When one arm and two-thirds of the front or back are visible (see fig. 55), the target is moving at approximately a 45-degree angle and a one-half-value lead is necessary.

(3) No Lead Target. --When both arms

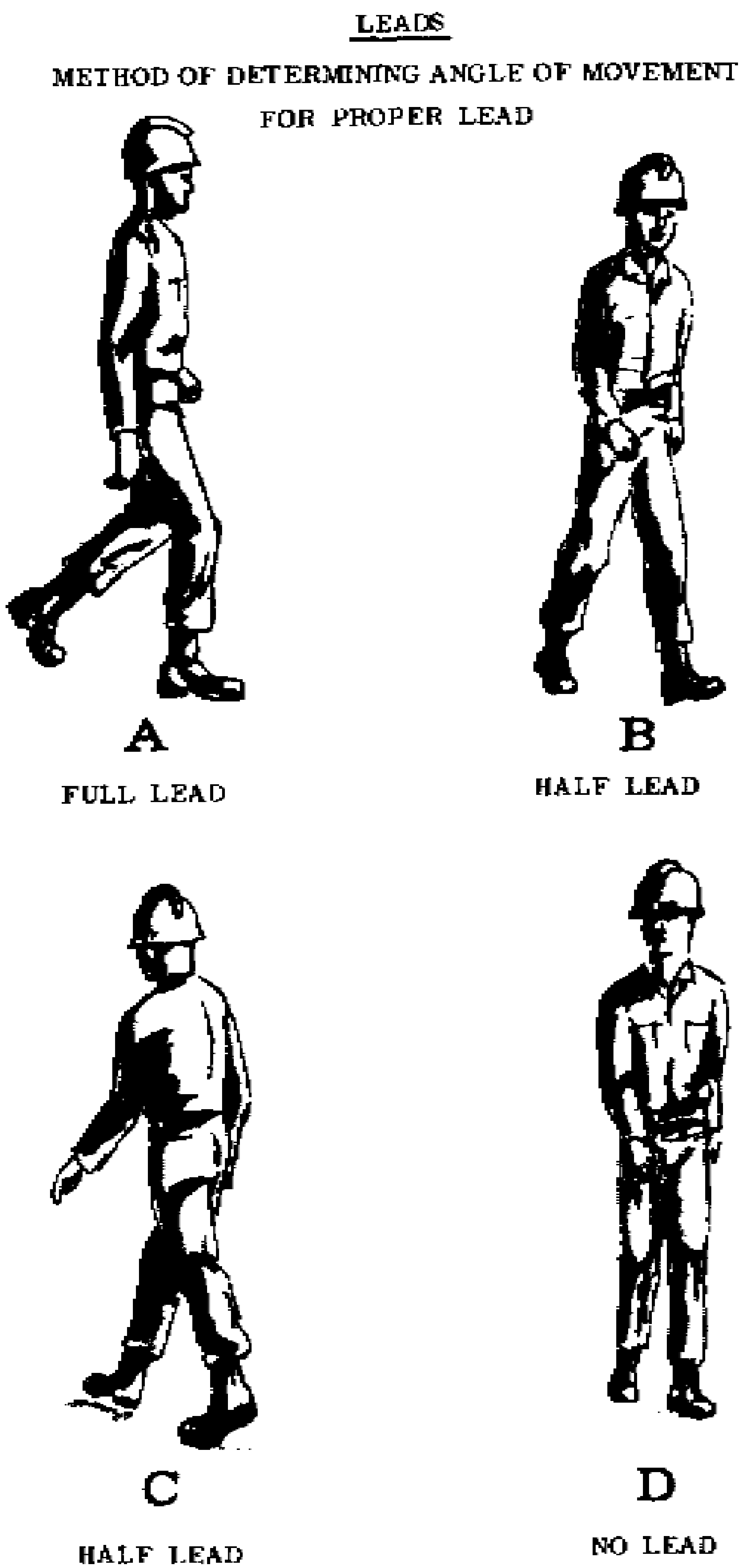


Figure 55.--Determining Angle of Movement.

and the entire front or back are visible, the target is moving directly toward or away from the sniper (see fig. 55) and will require no lead.

c. Double Leads.--The above leads hold true for a right-handed shooter firing on a target moving from his right to left. If the target is moving from left to right, the lead must be doubled due to a natural hesitation in followthrough when swinging against the shooting shoulder. This hesitation is extremely difficult to overcome even by the most experienced shooters.

Section V. INTELLIGENCE COLLECTION AND REPORTING

5501. GENERAL

Intelligence is that knowledge of the enemy, weather, and terrain which is used in the planning and conduct of tactical operations. The sniper teams, when employed independently or when attached to other units, will generally be located in a position where collection of this information is possible. Sniper team members must always be on the alert for the collection of such information.

5502. SOURCES OF INFORMATION

The best source of combat information is the individual Marine. Sniper team members must be trained to observe and report immediately any enemy information and unusual terrain conditions. Next in importance as a source is the enemy. Marines provide information from the following enemy sources:

a. Enemy Personnel. --By capture of enemy troops whenever possible.

b. Enemy Documents. --By search of enemy prisoners, enemy dead, and enemy installations for documents. When documents are taken from prisoners, care must be taken to be sure that they can later be identified with the person from whom they were taken.

c. Enemy Materiel. --By turning in or reporting the description and location of enemy materiel.

d. Enemy Activity. --By observing and reporting what the enemy does or fails to do.

5503. REPORTING INFORMATION

a. General. --Information must be reported

as quickly, accurately, and as completely as possible. An established method to remember how and what to report about the enemy is by use of the letters of the word "SALUTE":

S ize
A ctivity
L ocation
U nit
T ime
E quipment

An example of such a report is: "Seven enemy soldiers, traveling SW, crossed road junction on BLACK RIDGE at 211300 August carrying one machinegun and one rocket launcher."

b. Shell Reports (SHELREPs). --The sniper should also report all activity of enemy artillery, mortars, and bombs by using a SHELREP. The following format is suitable for either a written or oral report:

A lfa	From (or observer's call sign.)
B ravo	Observer's location.
C harlie	Azimuth to enemy gun.
D elta	Time shelling started.
E cho	Time shelling stopped.
F oxtrot	Coordinates of area shelled, if map is available.
G olf	Number and types of weapons fired.
H otel	Nature of fire; i.e., destruction, harassing, registration.
I ndia	Number and type of shells.
J uliet	Flash-bang time in seconds.
K ilo	Damage (usually in code).

c. Estimating Range by the Flash-Bang Method. --Sound travels about 330 meters per second (1,100 feet per second). When the observer sees the flash or smoke of a weapon, or the dust it raises, he starts counting seconds (one thousand one, one thousand two, etc.). He stops counting

when he hears the report of the weapon. If he stops on the count of "one thousand three," for example, the range from the observer to the gun is three times 330 meters per second or 990 meters (3,300 feet). Marines should practice timing their count with the second hand of a watch to develop the correct speed.

Section VI. CAMOUFLAGE

5601. GENERAL

Camouflage is a French word meaning "disguise" and is used to describe actions taken to mislead the enemy by misrepresenting the true identity of an individual's position or equipment. Individual camouflage of the sniper is that personal concealment he uses in combat to surprise and deceive the enemy. It is important that the sniper know how to use the ground for effective concealment. He adapts his dress for the best concealment while in the firing position, and carefully selects his routes between positions for as much concealment as possible.

5602. TARGET INDICATORS

A target indicator is anything a sniper does or fails to do that will reveal his position to an enemy. A knowledge of these indicators will assist the sniper in locating the enemy as well as preventing the enemy from locating him. These indicators are grouped into the three general areas of sound, movement, and improper camouflage.

a. Sound. --Although it is difficult to pinpoint a target's location by sound alone, it alerts the observer so that the possibility of eventual location of the target is increased.

b. Movement. --The degree of difficulty in locating moving targets depends primarily on the speed of movement. Slow, deliberate movements are much more difficult to notice than those which are quick and jerky. The techniques used in the hasty search, as explained in section II of this chapter, will provide the best means for locating moving targets.

c. Improper Camouflage. --The improper

use of, or lack of, camouflage and/or concealment provides indicators which reveal the majority of targets detected on the battlefield. Camouflage indicators are divided into the three general groups of shine, regularity of outline, and contrast with background.

(1) Shine. --Items such as belt buckles and other metal objects reflect light making them a particularly revealing signal to an observer. Therefore, any object which reflects light should be camouflaged.

(2) Regularity of Outline. --The human body, rifles, helmets, and vehicles are familiar outlines and, therefore, easily identified. For this reason, the shape of these familiar objects must be concealed by camouflage.

(3) Contrast With the Background. --When choosing a position for concealment, a background should be chosen that will virtually absorb the sniper and his equipment. In preparing his position, the sniper must avoid leaving telltale signs of his presence. For example, a parapet of freshly dug earth around a foxhole is as noticeable as a flag waving over it. An area having no vegetation other than a row of evenly spaced bushes leaves little doubt in an observer's mind as to the presence of a defensive position. Another problem encountered when using vegetation for camouflage is that it will eventually wilt and turn brown, thus providing a contrast in background.

5603. STICK CAMOUFLAGE

When available, stick camouflage is effective for covering exposed parts such as the face, neck, and hands. When applying camouflage to the face and neck, two men should team up to ensure a complete and effective job. The color stick used will depend upon the geographical area in which the sniper is operating; e.g., white stick in snow areas;

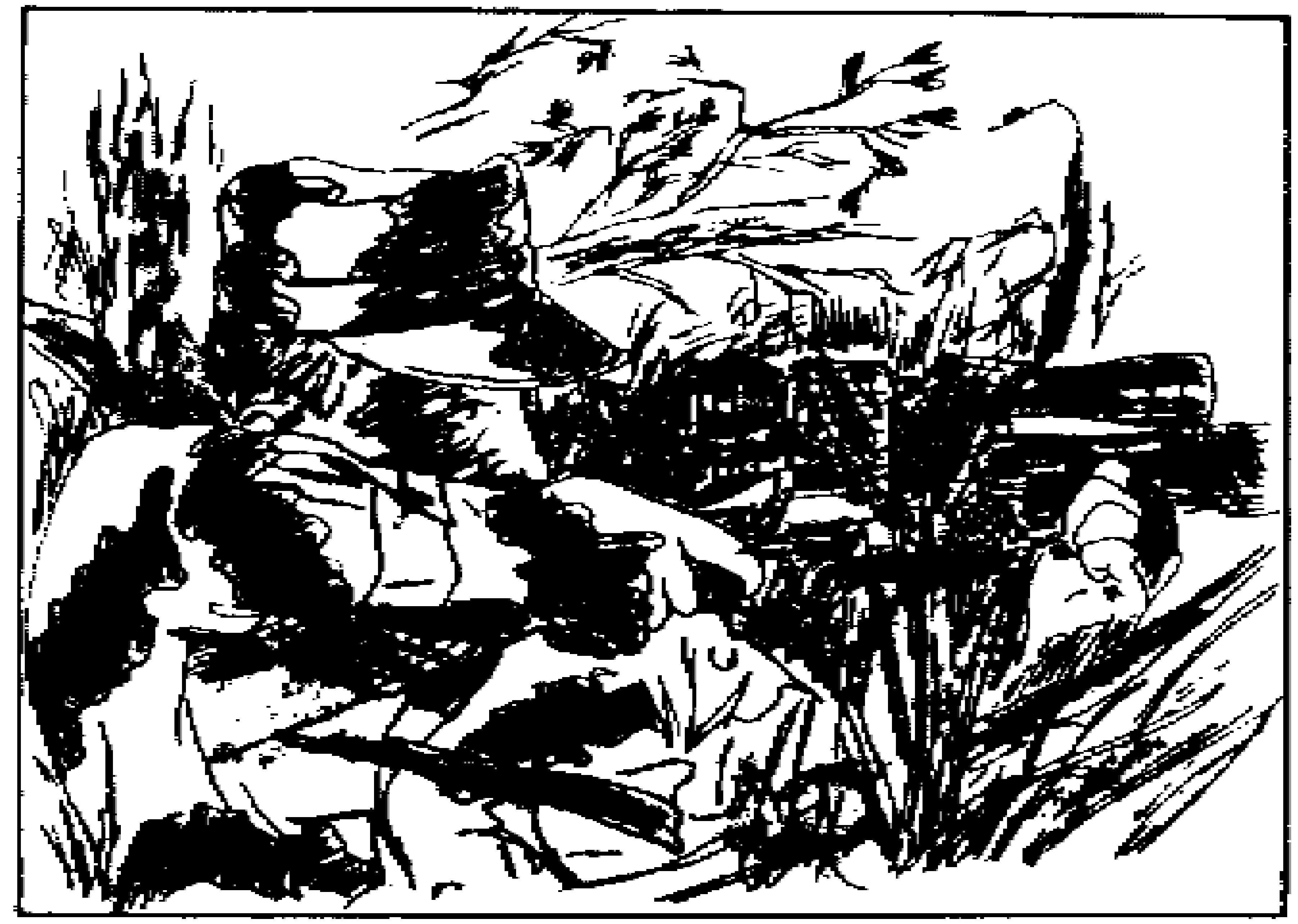


Figure 56. --Camouflage in Jungle or Forest.

desert sand or sand stick in desert areas; and forest green, olive drab, or black in jungle areas. (See fig. 56.)

5604. FIELD EXPEDIENTS

The regular issue items of camouflage materials will not always be available to the sniper; therefore, he must be prepared to use what is available. Most common of the materials that are available are mud, cloth, and foliage.

a. Mud. --Mud provides excellent camouflage for shiny objects such as the belt buckle, but it should not be used on the skin due to its high bacterial content.

b. Cloth. --Excellent camouflage can be produced by mixing pieces of cloth in a suitable

pattern and attaching them to the utilities or cover. The cloth can be obtained from discarded clothing, packs, ponchos, caps, socks, helmet covers, blankets, or any other material that is readily available.

(1) Coloring the Cloth. --Mud, charcoal, burnt cork, charred coffee grounds, prepared pigment, camouflage stick, or dye may be used to vary the color of the pieces of cloth. Use of fuel, oil, and grease should be avoided because of their strong odor.

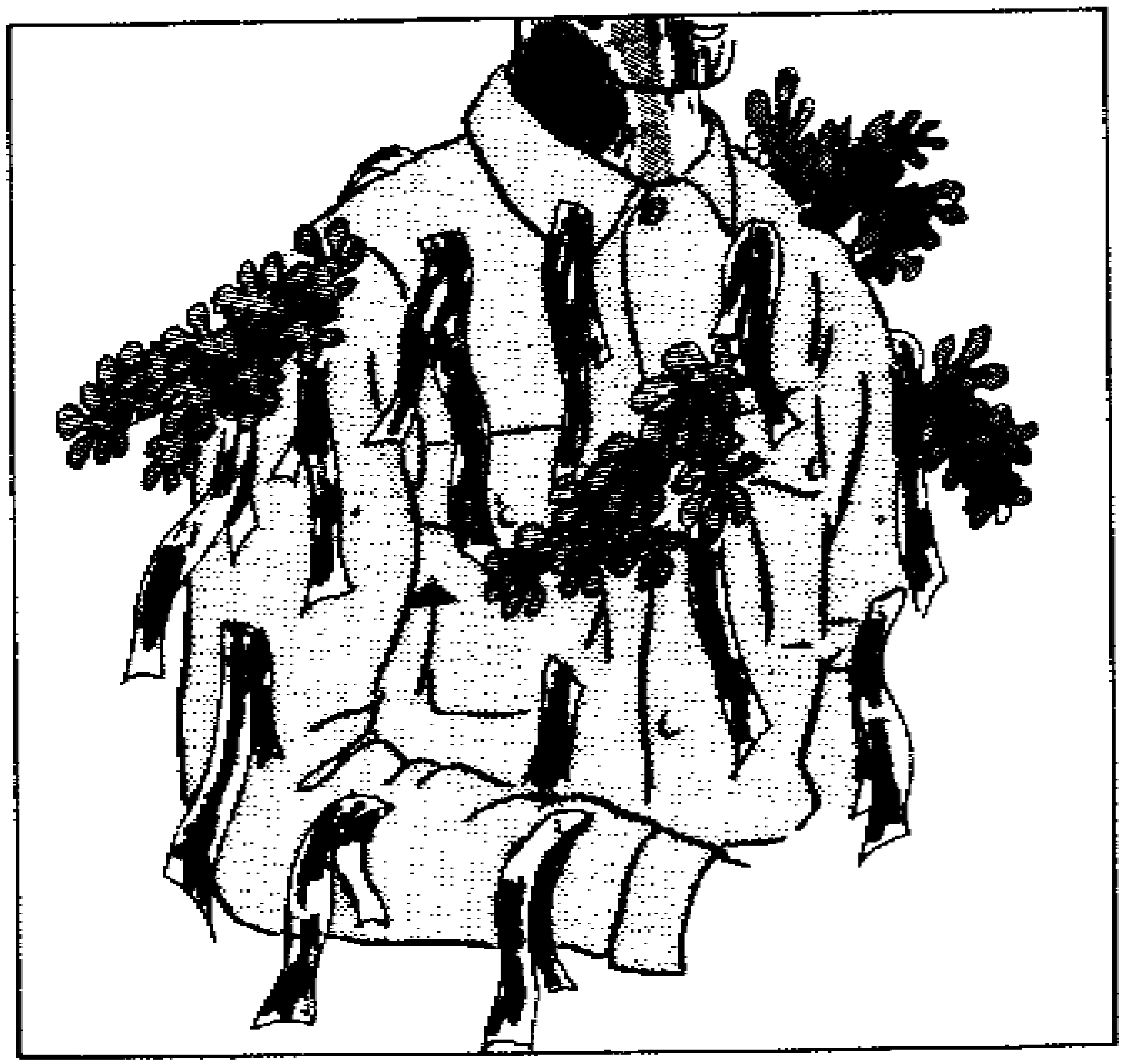


Figure 57. --Camouflage Attached to the Utility Jacket.

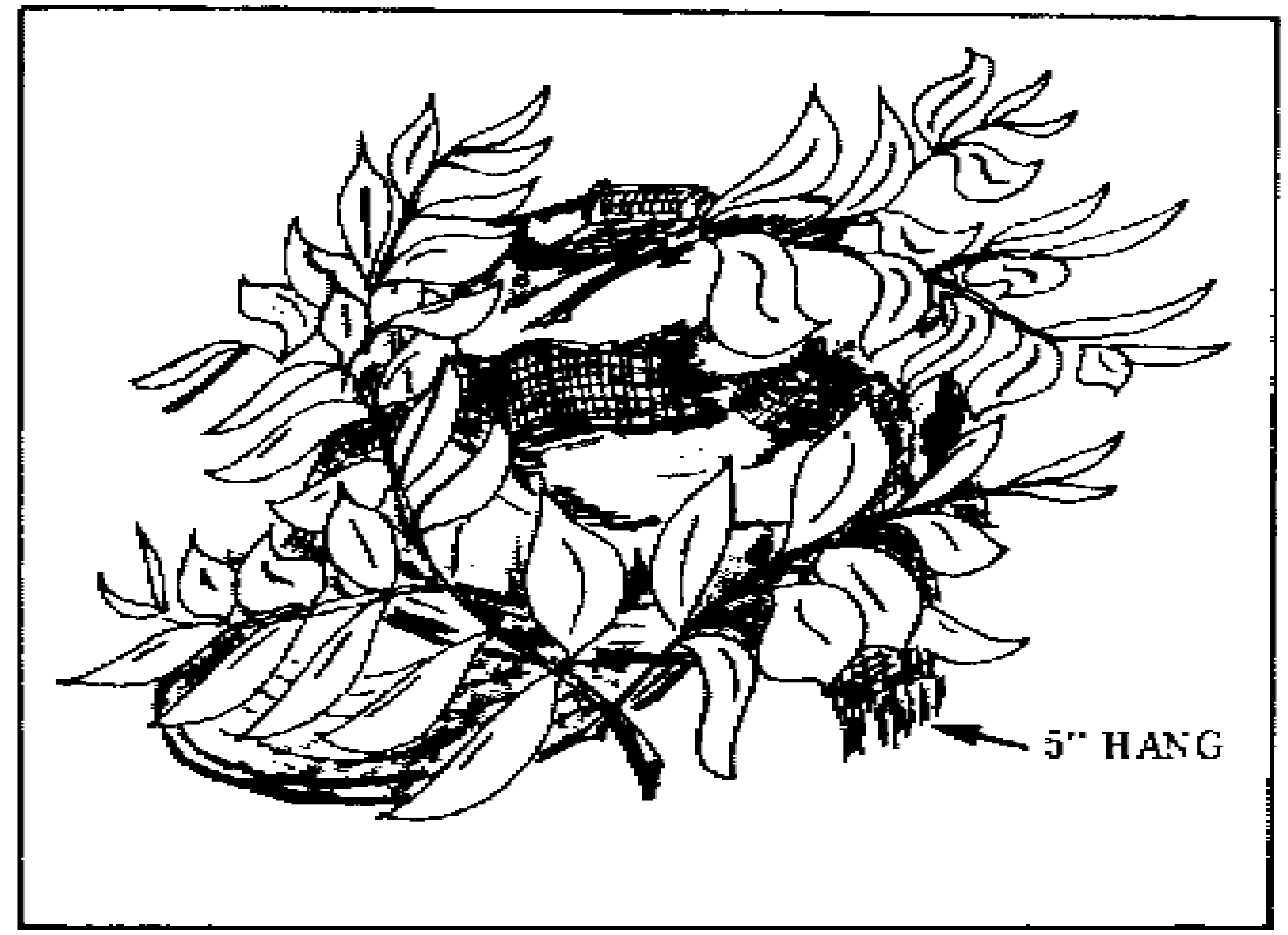


Figure 58. --Camouflage Attached to the Utility Cover.

(2) Attaching the Cloth. --When attaching prepared garnish to the utilities, the pieces of cloth are stitched loosely, overlapping, with an irregular pattern of texture, line, and color. The same technique is used on the cover, taking care to leave material hanging down around the bottom of the cover at least 4 to 5 inches. (See figs. 57 and 58.)

c. Foliage. --In most cases, natural foliage is preferred to artificial camouflage, but is sometimes difficult to secure to the body and gear. Rubber bands cut from discarded truck, jeep, or bicycle tubes can be used for this purpose. (See fig. 59.)

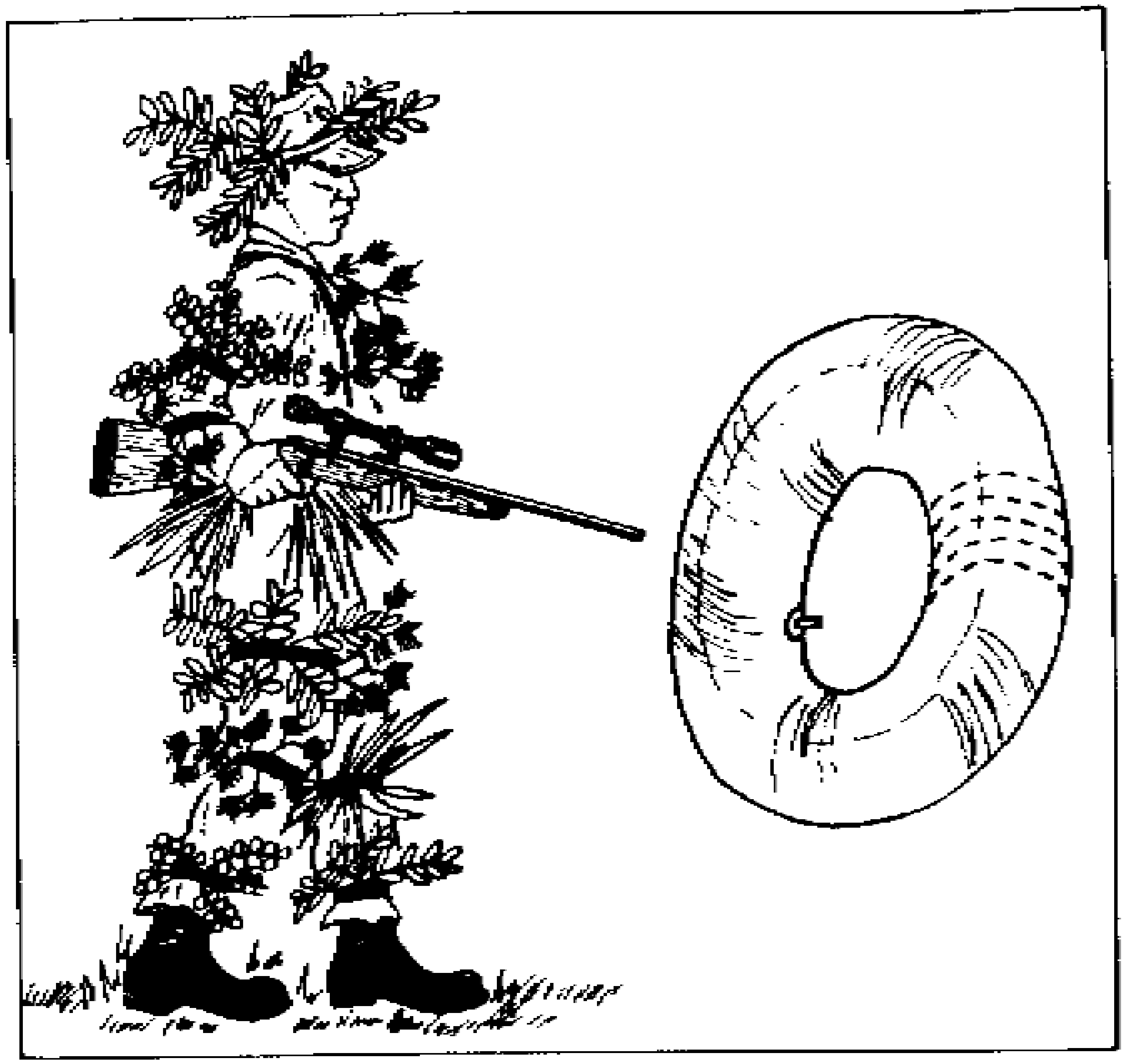


Figure 59.--Camouflage Attached By Rubber Loops.

5605. CAMOUFLAGE IN VARIOUS GEOGRAPHICAL AREAS

Effective concealment of the individual depends largely on the choice and proper use of background. Since background varies widely in appearance, each location requires individual treatment to ensure a blending with the background. It must be remembered that an individual may be invisible

from the ground but easily seen from the air or surrounding high ground. Particular care must be taken in flat areas in the desert or snow to avoid shadows or silhouettes.

a. Snow.--When in open areas with heavy snow or in wooded areas with snow in the trees and on the ground, a full cape or suit is worn. In snowy wooded areas where the trees are not covered, snow pants and green-brown camouflage top and headgear are used. A hood fashioned from chicken wire and cloth is especially effective in snow. (See fig. 60.)



Figure 60.--"The Hood."

b. Desert. --In sand and desert areas, texture camouflage is normally not necessary. The hands and face should be blended into a solid tone using the camouflage stick corresponding to the color of the terrain. A hood is also effective in this terrain.

c. Jungle. --In jungle areas, foliage, artificial camouflage, and camouflage stick are applied in a contrasting pattern with the texture relative to the terrain.

5606. PREPARATION OF POSITIONS

In preparing his position, the sniper must exercise the same care as in individual camouflage to ensure complete concealment from observation. He must not provide the enemy target indicators such as spoil, wilted or brown foliage, and stripped branches or bushes in his area.

a. Foxholes. --One of the most effective positions is a well-prepared and carefully camouflaged foxhole. A cover for the hole is desirable to prevent detection and to allow safe movement within the foxhole. The cover should be sturdy and carefully prepared to blend perfectly with the surrounding terrain. The foxhole should not be used near an inhabited area since accidental discovery is likely.

b. Security and Alternate Positions. --When members of a team are preparing positions, one sniper must always act as lookout while the other works on the position. An alternate position should then be prepared which, if possible, is accessible from the primary position by a covered route.

5607. CAMOUFLAGE DURING MOVEMENT

a. Camouflage Consciousness. --The sniper must be camouflage conscious from the time he departs on a mission until the time he returns. He

must constantly observe the terrain and vegetation, changing camouflage as the terrain and vegetation change. He should utilize shadows caused by vegetation, terrain features, and cultural features to remain undetected. He must master the techniques of hiding, blending, and deceiving.

(1) Hiding. --In hiding, the sniper uses any means available to completely evade detection.

(2) Blending. --Blending is the art of using camouflage in such a way as to be indistinguishable from the surrounding area.

(3) Deceiving. --In deceiving, the enemy is tricked into false conclusions regarding the sniper's location, intentions, or movement. By planting objects such as cans or cartons, the enemy may be decoyed into the open where he can be brought under fire. (See fig. 61.)

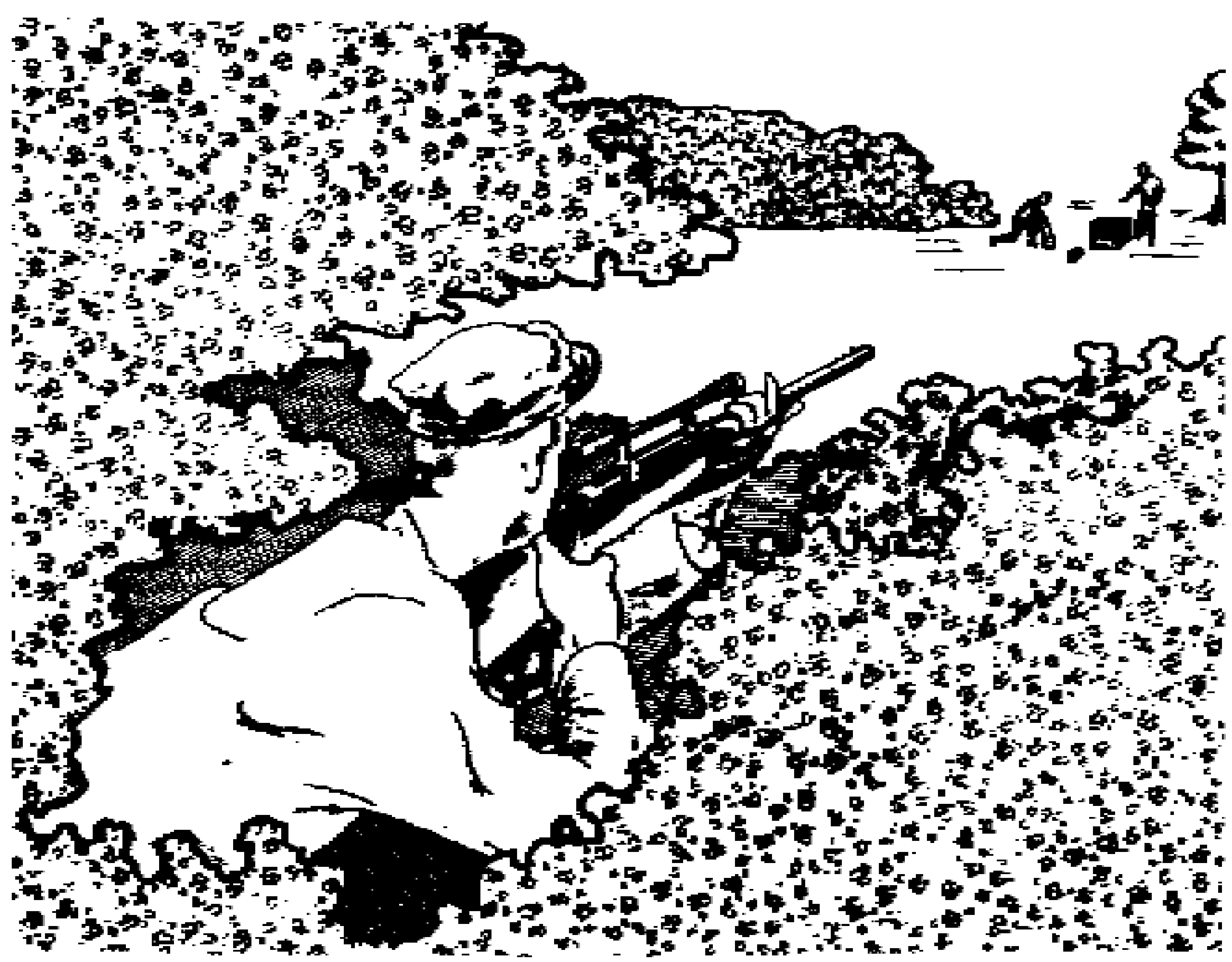


Figure 61. --Deceiving the Enemy.

b. Footprints.--The sniper must avoid leaving footprints on open ground. Whenever possible, he must move parallel with such terrain features as rows of vegetation, fence lines, and cultivated rows.

c. Return to Friendly Area.--Probably at no other time during the course of the mission will the sniper have more of a tendency to be careless than when he is returning to a friendly area. Fatigue and undue haste may override caution and planning. The enemy will have more intensive intelligence as the sniper's activities become known. Camouflage, concealment, and cautious movement then become of paramount importance. Attention to every detail and careful planning will enable the sniper to return safely to his unit and be available to execute another mission.

Section VII. INDIVIDUAL MOVEMENT

5701. GENERAL

The sniper, moving from position to position, runs the calculated risk of offering target indicators to the enemy in trade for a more advantageous location. This section discusses some movement rules and practices by which the sniper can reduce or avoid his risk of being detected.

5702. PREPARATION FOR THE MOVEMENT

In preparation for travel, the sniper can take many effective precautions. He must:

a. Camouflage his person and equipment.

b. Pad or tape loose items of equipment so they will not betray him by rattling or shining.

c. Wear soft well-fitted clothing. Starched clothing makes noise as the wearer moves. Loose or baggy clothing will snag on trees and brush. Thigh and ankle ties will take up any slack in field trousers. Other tie-downs should not be used as they may interfere with good circulation.

d. Wear a soft cap with its indistinctive outline, unless for some reason, the helmet is required. Helmets can be camouflaged, but they muffle and distort sound, especially in any wind.

e. Not carry any equipment unnecessary to his mission.

5703. MOVFMENT

a. General.--When possible, the sniper moves in darkness, fog, smoke, or haze. He travels by moving from one place of cover or concealment to the next one. He may rush, walk, or crawl. His first rule of safety is to always assume that his area of movement is under observation.

b. Other General Rules

(1) From his position, the sniper carefully chooses his next location, having first carefully observed the area for enemy signs.

(2) He selects his entire route to the new position before making his move.

(3) He halts at the new position, listens, and observes. He notes, especially, any activity of birds or animals which might betray his presence.

(4) Moving through tall grass, he changes direction frequently. Straight line travel through grass causes it to wave unnaturally and thus attract attention. The best time to move in grass is when the wind is blowing.

(5) Moving across roads or trails, the sniper seeks culverts, low spots, and curves.

(6) Moving across plowed fields, the sniper crawls in the furrows. If necessary to cross the furrows, he does so at the lowest part of the field.

(7) The sniper avoids steep slopes, areas of loose stones, cleared areas, and ridge lines.

(8) He takes full advantage of distractions such as artillery fire or passing aircraft.

c. Rush.--The rush is the fastest way to move from one position to another. (See fig. 62.) The correct technique is as follows:

(1) From the prone position (fig. 62-1), slowly raise the head and select the next position (fig. 62-2).

(2) Slowly lower the head. Draw in the arms to the body, keeping elbows down, and pull the right leg forward (fig. 62-3).

(3) With one movement, raise the body by straightening the arms (fig. 62-4).

(4) Spring to the feet stepping off with the left foot (fig. 62-5) and run to the new position by the shortest route (fig. 62-6).

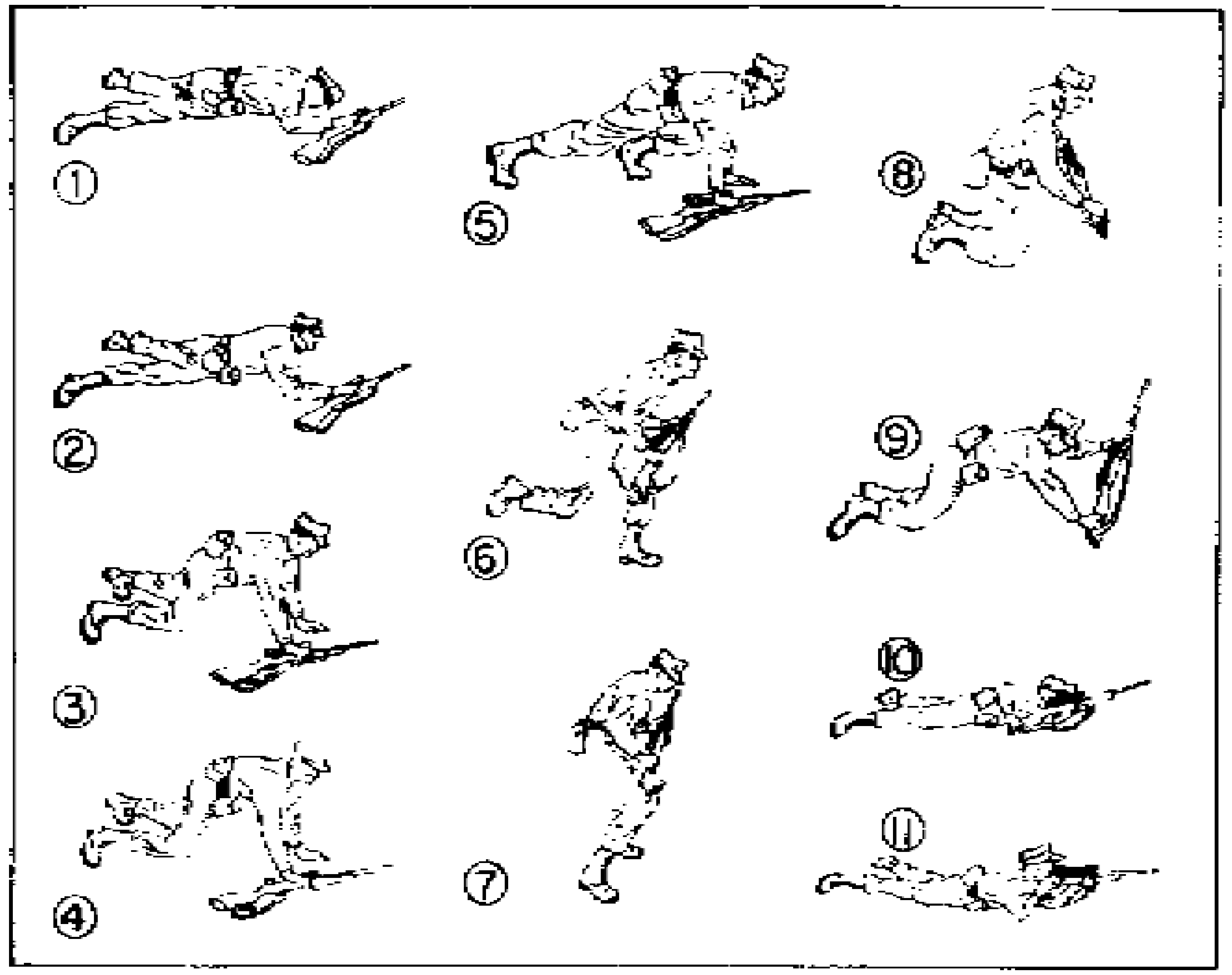


Figure 62.--Rushing.

(5) Just before hitting the ground, plant both feet (fig. 62-7) and drop to the knees, at the same time sliding the right hand to the heel of the rifle butt (fig. 62-8).

(6) Fall forward, breaking the fall with the butt of the rifle. Avoid injury to the scope (fig. 62-9).

(7) Shift the weight of the body to the left side. With the right hand, place the butt of the rifle in the hollow of the right shoulder (fig. 62-10).

(8) Lie as flat as possible (fig. 62-11). If it is believed the move was observed by the enemy, move to the right or left if cover and concealment exist.

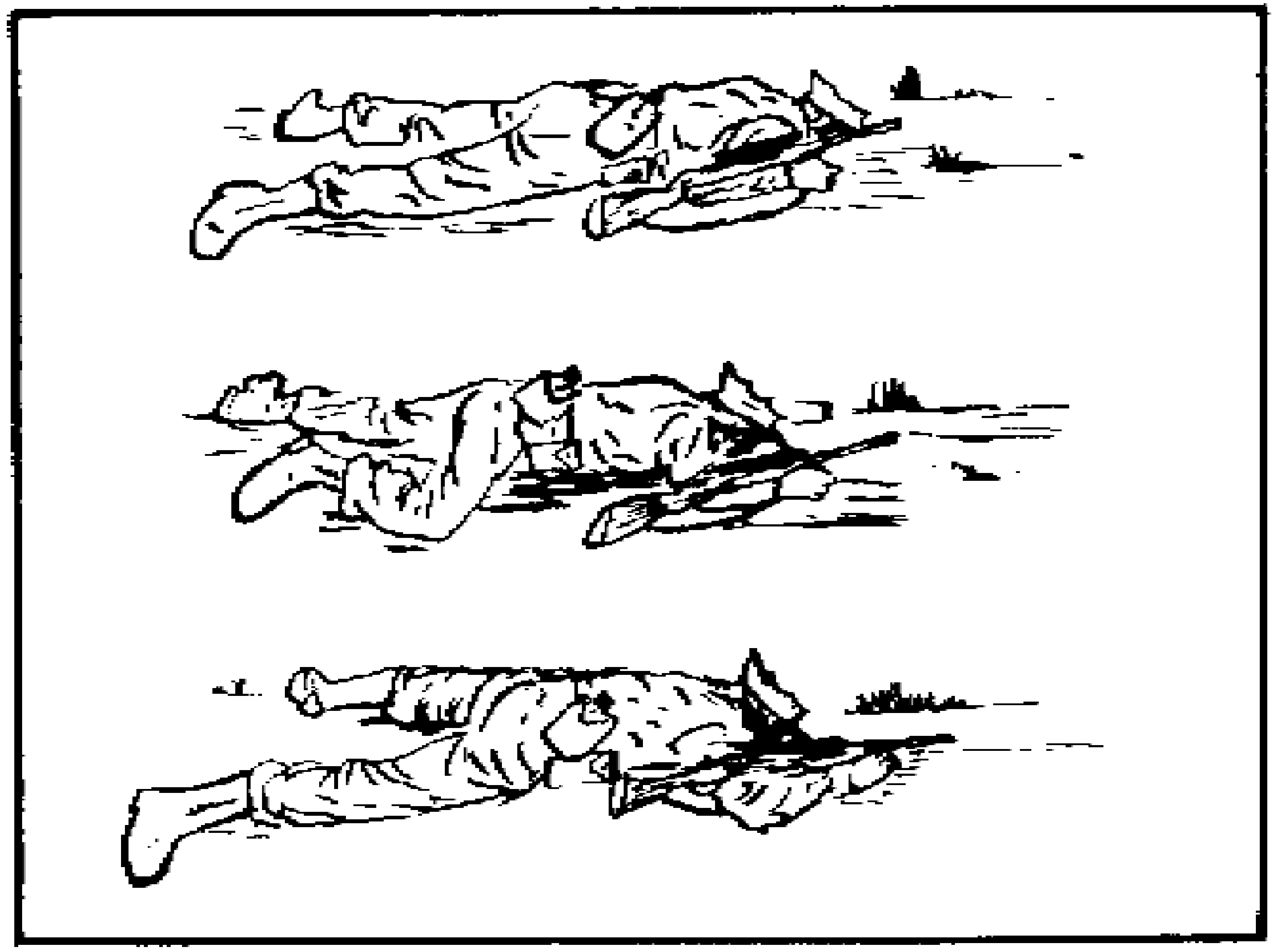


Figure 63.--Low Crawl.

d. Crawl.--There are times when it is necessary to move with the body close to the ground to avoid being seen. There are two ways to do this: the low crawl and the high crawl. Use the method best suited to the conditions of visibility, cover and concealment available, and speed required.

(1) Low Crawl.--The low crawl is used when cover and concealment are scarce, when visibility permits the enemy good observation, and when speed is not essential. (See fig. 63.) The correct technique is as follows:

(a) Keep the body as flat as possible against the ground. Grasp the rifle sling at the upper sling swivel. Let the balance of the rifle rest on the forearm and let the butt of the rifle drag on the ground.

(b) To start forward, push the arms forward and pull the right leg forward, then



Figure 64.--High Crawl.

then pull with the arms and push with the right leg.

(c) Change the pushing leg frequently to avoid fatigue, and be careful not to raise or lift any part of the body.

(2) High Crawl.--The high crawl is used when cover and concealment are available, when poor visibility reduces enemy observation, and when more speed is required. (See fig. 64.) Keep the body free of the ground and rest the weight on forearms and lower legs. Cradle the rifle in the arms, keeping its muzzle off the ground. Keep the knees well behind the buttocks. Move forward by alternately advancing the right elbow and left knee, left elbow and right knee.

e. Crawling on Hands and Knees.--(See fig. 65.) The low and high crawl are not suitable when very near the enemy since they result in shuffling noises which are easily heard. To crawl on the hands and knees, the weapon is laid on the ground. With the right hand, feel for or make a clear spot for the knee. Keep a hand on the spot and bring the right knee forward until it meets the hand. Repeat the same procedure with the left hand and knee. To



Figure 65. --Crawling on Hands and Knees.



Figure 66. --Walking; Toe Down Gently.

move the weapon, feel for a place, clear it, and lift the weapon into position. Crawl very slowly and keep movements absolutely silent.

f. Walking. --To walk when extreme quiet is necessary, make footing sure and solid by keeping the weight on one foot as each step is taken. Raise the other leg high to clear brush or grass. With the weight on the rear leg, gently let the foot down, toe first. (See fig. 66.) Feel with the toe to pick a good spot. Lower the heel after finding a solid place. Shift the weight and balance to the

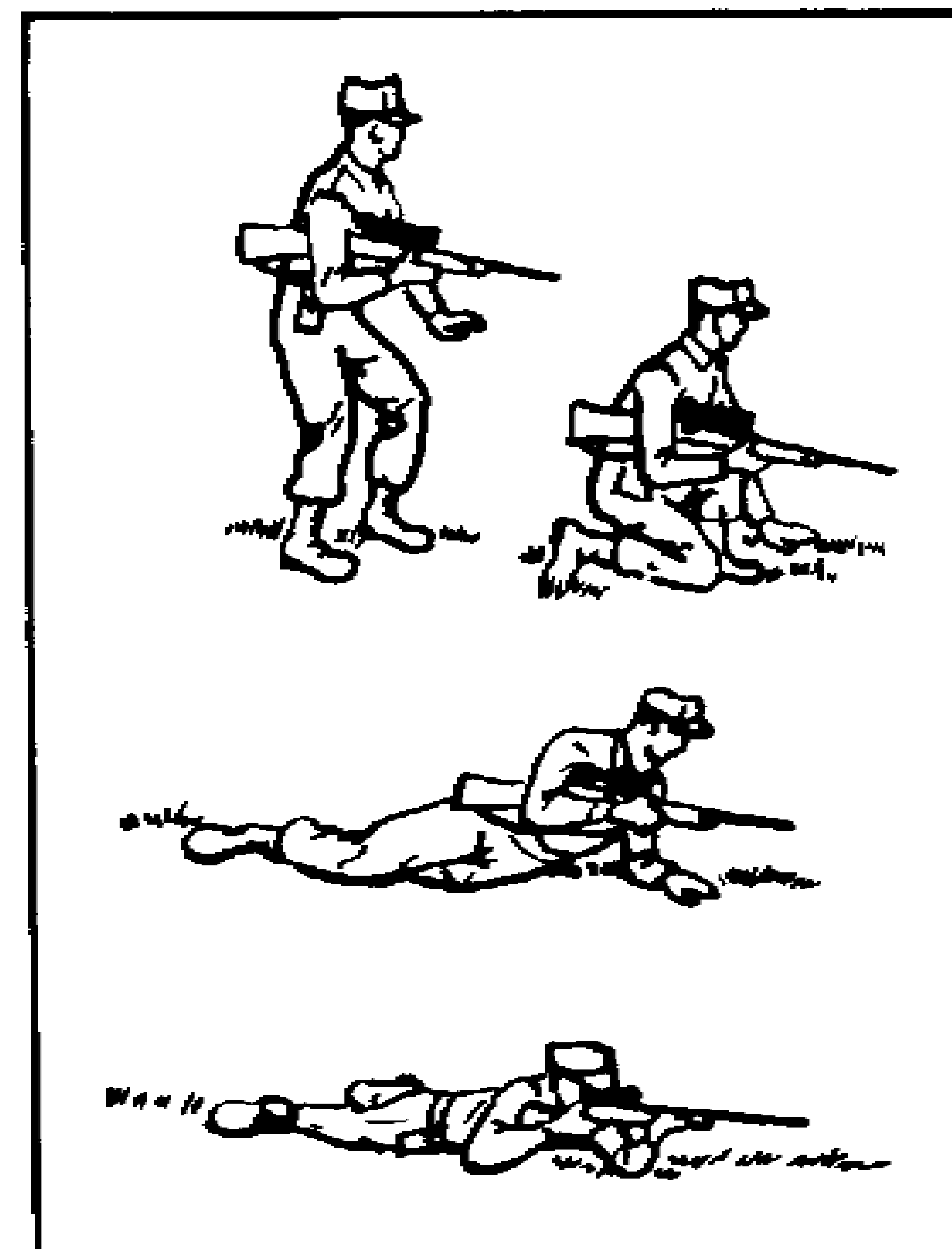


Figure 67. --Feel for the Ground.

forward foot. Take short steps to avoid losing balance. At night, hold the weapon with one hand and extend the other forward, feeling for any obstructions.

g. Assuming the Prone Position. --To assume the prone position, crouch slowly. Hold weapon under the arm and feel for a clear spot with the weight on the free hand and opposite knee. (See fig. 67.) Raise the free leg up and back, and lower it to the ground, feeling with the toe for a clear spot. Roll gently into the prone position. If discovered by the enemy, go into the prone position rapidly.

5704. ACTION UNDER FLARES

If caught in the open by an overhead flare, the sniper immediately hits the ground. Since the burst of light is temporarily blinding, the sniper may not have been seen. If the flare is heard being fired, a sniper in the open gets down before it bursts. Movement is resumed as soon as the flare burns out. If a sniper is caught in the light of a ground flare, he moves out of the lighted area quickly and quietly. If a sniper is caught by a flare when crossing an obstacle, such as barbed wire, he crouches low and remains motionless until the flare burns out.

Section VIII. SURVIVAL, EVASION, AND ESCAPE

5801. GENERAL

In modern combat, small units sometimes fight in a dispersed formation, or are on special missions forward of friendly lines. In these situations, there is a likelihood of these units becoming isolated, requiring them to subsist for days or weeks while making it back to friendly forces. Under these circumstances, the ability to evade the enemy and to escape if captured demands skills in survival. Since the chances of being exposed to such an emergency are always present, survival techniques must be a part of the sniper's basic skills.

5802. SURVIVAL

a. General. --An important part of a sniper's mission is to get himself and his equipment back to his unit in good condition. An injured or sick sniper, or a sniper with lost or broken equipment, becomes a liability rather than an asset. With a sound knowledge of survival techniques, the odds of surviving in the field are greatly increased.

b. Movement in Enemy Territory. --Whenever traveling in areas in which the enemy may be present, the sniper must keep alert at all times and must take the following precautions:

(1) Keep his location pinpointed as accurately as possible at all times by use of the compass, watch, sun, map, or landmarks.

(2) Keep his equipment readily available at all times in case he must move in a hurry.

(3) He can guide on roads and trails during movement, but he must stay alert. He

should avoid crossroads and road junctions, and conceal himself on the approach of any other person until he passes or is determined to be friendly.

(4) He should avoid travel on exposed ridge crests, and should consider the advantages of travel by stream.

(5) When close to known enemy locations, he should move shortly after sunset or shortly before sunrise. During these periods, there is sufficient light to enable him to avoid enemy installations and minefields, but dark enough to prevent recognition by the enemy.

c. Native Assistance. --Villages and people should be avoided as long as possible; however, when sickness or injury prevents proceeding without help, friendly native assistance may be necessary. When necessary to contact natives for assistance, caution should be observed during the first contact. An individual, rather than a group, should be contacted in an isolated area. Young adults and the rich should be avoided, as should heavily populated areas such as villages. Once contact has been made, the following should be observed when among the local people:

(1) Deal with the recognized head man.

(2) Be careful not to offend them; treat them like the human beings they are.

(3) Show friendliness, courtesy, and patience. Don't show fright nor flagrantly display weapons.

(4) Respect local customs, manners, property, and LEAVE THE WOMEN ALONE.

(5) Do not take offense at pranks as many people are fond of harmless practical jokes.

(6) Learn as much woodcraft as possible and take advice on local hazards.

(7) Avoid physical contact without seeming to do so.

(8) Paper money is worthless in most areas, so items such as tobacco, salt, and rations

should be used to barter.

(9) IT IS IMPORTANT TO LEAVE A GOOD IMPRESSION so that others may get this help when needed.

d. Shelter. --The situation may arise when shelter will be required. In selecting a shelter, imagination and training should be used in the choice of a site and the type shelter to use.

(1) Selecting a Site. --When possible, high spots should be used in a protected area to avoid cool night winds. Low spots, especially dry river beds, can be flooded in a short period of time. The shelter should not be placed under large trees with dead limbs or under coconut trees.

(2) Types of Shelter. --The poncho provides an adequate shelter. A thatch shelter can be made by covering a framework with a good thickness of leaves, pieces of bark, or mats of grass. Banana leaves and leaves from the palm tree are especially good materials. The thatches are attached from the bottom upward. The shelter is ditched after completion in the same manner as is a tent.

(3) Beds. --Do not sleep on the ground. A platform can be made with bamboo or small branches and covered with palm leaves. Jungle vines can be used as rope or twine to tie it together.

e. Health. --To operate efficiently, the sniper must keep his body healthy and strong. Observation of certain commonsense rules will maintain this condition.

(1) General Precautions

(a) Personal hygiene must be practiced, especially in regard to the feet.

(b) Jungle diseases are carried by mosquitos, ticks, lice, and contaminated food and water, so they must be avoided.

(c) When contracting a fever, no

attempt to travel should be made until the fever is gone. By drinking plenty of treated water, recovery will be speeded.

(d) Infection should be avoided as it spreads rapidly in the tropics. Every wound and sore should be treated immediately, and a sterile dressing should be used if possible.

(e) Heat injury can be prevented by drinking purified water, relaxing in the shade, and using salt tablets.

(2) Malaria. --Malaria prevention pills are taken as required to avoid malaria. The headnet should be worn in mosquito areas, especially between sundown and 2 hours after dark and 2 hours before daylight until sunup. USE REPELLENT FREQUENTLY. Clothing should be tucked into the boots or the socks.

(3) Dengue Fever or Yellow Fever. --The headnet and repellent should be used for prevention as these are mosquitoborne diseases.

(4) Dysentery. --Dysentery is caused by polluted food or drinking water. Contaminated food or water must be avoided.

(5) Leeches. --Leeches are sucking worms that cling to blades of grass, leaves, and twigs and fasten themselves to passing individuals. Bites are frequently followed by infection. They are removed by touching the leech with a lighted cigarette, match, or moist tobacco or salt. The body should be searched periodically and any leeches removed. Water should be checked before drinking since leeches are dangerous if swallowed. By securely tucking the trousers into the boots and saturating the tops of the boots and bottoms of the trousers with standard insect repellent, the problem can be greatly reduced.

(6) Flukes or Flatworms. --Flukes or flatworms are microscopic parasites, found in sluggish fresh water, that cause internal damage. They enter the body through the skin, in food, or

in drinking water. If possible, only fresh running water should be used for bathing.

(7) Snakes. --Aggressive snakes are the exception and, in spite of rumors, cannot outrun a man. To treat poisonous snake bites (if it cannot be recognized as nonpoisonous, it should be considered poisonous), the following steps are taken:

(a) Immediately tie a band about 4 inches above the bite in the direction of the heart. tie the band tight BUT NOT TIGHT ENOUGH TO CUT OFF ARTERIAL CIRCULATION; the pulse should be evident below the band.

(b) Body activity should be kept to a minimum by lying down, remaining quiet, and avoiding food or alcohol.

(c) Keep the bitten area lower than the heart.

(d) Wipe the skin around the bite free of dripped venom.

(e) Sterilize the skin with an antiseptic, soap and water, or by the best means available.

(f) If a doctor or corpsman is readily available, no action should be taken until he arrives. If it is necessary to move for help, body activity should be kept to a minimum.

(g) If medical assistance is not available for at least an hour, an X-cut is made through each fang mark without delay. The incision is made 1/4 to 1/2 inch long and 1/8 to 1/4 inch deep, depending on the thickness of the skin. Care must be taken to avoid cutting large blood vessels, tendons, or nerves. A sterilized sharp knife or razor blade should be used.

(h) If no suction cup is available and there are no sores on or in the mouth, apply the mouth directly to the bite, suck out the venom, and spit it out. Try not to swallow any of the poison although it will not be harmful.

(8) Wounds. --The wound should be

cleaned out with hot water. If hot water is not available, the wound should be washed out with urine and all foreign matter picked out. In an extreme emergency, maggots may be used to clean out a wound since maggots eat only dead tissue.

(9) Bleeding. --Bleeding can be controlled by pressure directly on the wound, by elevating injured part, by use of pressure points, by cold applications, and by use of a tourniquet. THE TOURNIQUET IS USED ONLY WHEN ALL ELSE FAILS and the bleeding is arterial (indicated by bright red spurting blood). In case of heavy arterial bleeding as in the case of a shattered limb, the tourniquet is placed a few inches above the wound in the direction of the heart. Tighten until all blood flow stops and no pulse is felt below the tourniquet. ONCE APPLIED, DO NOT REMOVF TOURNIQUET UNTIL YOU CAN GET TO A DOCTOR. If no medical attention is received after several hours, gangrene will set in so it is important to attempt evacuation at the earliest opportunity.

(10) Frostbite. --When a part of the body gets frostbitten, it becomes grayish or white and loses feeling. Frequently, there is no pain, so the face and hands must be watched for signs. The face, hands, and feet are most frequently frostbitten. When frostbite does occur, the area should be warmed by gently placing a bare hand on it. FROSTBITTEN AREAS SHOULD NOT BE RUBBED WITH SNOW. The following precautions should be taken:

(a) Warm, dry gloves or mittens should be worn. Cold metal must not be touched as the hands will stick to it. The hands can be warmed by placing them inside the clothing in the armpits. Frequent checks for numb fingers should be made.

(b) Feet require more attention

than any other part of the body. Wet feet and tight-fitting sock and shoes which cut off circulation are the two main causes of frostbitten feet. Shoes and socks should fit loosely to allow good blood circulation. The shoes should be large enough to allow good blood circulation. The shoes should be large enough to allow the wearing of two pairs of socks without cramping or binding the feet. GI cushion-sole socks are ideal for the inner layer, and the outside socks should be heavy wool. Sufficient extra socks should be carried to allow for a change at least once a day, or after the socks and shoes have become soaked. Wet socks are hung on the outside of the pack or placed between layers of clothing to dry.

(c) When available, overshoes are worn in wet, cold weather, or in snow. They also provide insulation in extremely cold weather.

(d) When using snowshoes, the straps are adjusted so that they do not bind the feet and cut off circulation.

(e) Shoes and socks are removed during rest periods, and the feet are examined for frozen areas. If there are none, the feet are massaged to restore circulation. If there are frost-bitten areas, they can be warmed by putting the feet under a buddy's clothing next to his skin. When alone, the area is warmed gradually at body temperature. Blisters should not be broken. The feet should be washed thoroughly at the end of each day's trek or rubbed dry with a rough cloth. Shoes and socks are dried and the feet examined for frostbite or blisters.

5803. EVASION

a. General. --Evasion is classified as either short-range or long-range. The difference lies in the conditions which confront the evader. The principles remain the same while the technique will

change to meet the situation. Short-range evasion occurs in and around the combat zone or areas of hostility when return to a friendly unit can be accomplished within a matter of hours or perhaps a day or so following isolation. Normally, the individual has enough clothing and food and generally is oriented as to direction, distance, and terrain. In contrast, the long-range evader, such as a sniper returning from an extended patrol, must operate over completely foreign terrain with little or no food or equipment. The sniper is generally concerned with short-range evasion as a means of returning to friendly lines from either an ambush or when cut off from his operating unit as a result of an ambush or other action.

b. Basic Principles.--The following principles must be observed to accomplish a successful evasion:

(1) Prepare a detailed plan.

(2) Observe the elementary rules of movement, camouflage, and concealment.

(3) Do not hurry. Patience and perseverance are absolutely necessary when evading. Hurrying only increases weariness and decreases alertness.

(4) Conserve food since resupply is a matter of chance.

(5) Conserve strength.

c. Techniques

(1) Initial Action.--An individual becomes an evader when he finds himself isolated in enemy dominated or controlled territory and is unable to continue his assigned mission, is prevented from joining his unit by enemy action, or is returning from an ambush mission. The evader must leave the immediate area and select a hiding place at a safe distance. While in hiding, the evader should take stock of the situation and devise a plan. The amount of time spent in hiding is governed by enemy activity and the evader's physical

condition. Before proceeding, his plan should be set with alternatives to as many eventualities as can be perceived.

(2) Travel.--Methods of travel are probably the most important phases of evasion. History books are filled with cases of captured evaders merely because they followed the easiest and shortest route or failed to employ the simple techniques of concealment and camouflage. In general, the safest route is that which avoids major roads and populated areas, even if this involves expending additional time and energy. REMEMBER: IF IN ASIA, STAY OUT OF VILLAGES AS AN AMERICAN IS EASILY SPOTTED.

(3) Camouflage and Concealment.--The use of natural concealment such as wooded areas, trees, brush, rocks, and other terrain features are highly recommended. Any method for hiding will increase the chances for success. When gaining concealment, the evader must blend in with natural surroundings and break up identifying outlines. He must select campsites or routes of travel carefully. Camouflage discipline must be maintained 24 hours a day.

(a) Cooking.--Cooking fires should be smokeless, using dry wood. Cooking at night is to be avoided; however, if necessary, small flames in a pit can be used providing no light escapes. All cooking should be done with as few odors as possible and when there is little or no wind. All food caches are camouflaged, and all utensils darkened.

(b) Bivouacs and Rest Areas.--Camp camouflage cannot be stressed too strongly as it must be carried on 24 hours a day. Trails to camp should be brushed over and blended to leave the area looking natural. Shelter should be in shadows and blend in with the natural surroundings. All natural materials must be kept fresh to

keep from getting discolored. Bury all refuse and camouflage the area.

(4) Disguise.--Evaders will normally consider the possibility of disguise. Utilizing civilian attire to pass as a native of the area is extremely dangerous and should be ruled out when the race of the evader is different from that of the natives. Even in an area where racial dissimilarities would not betray the evader, the mannerisms of walking, smoking, eating, and lack of knowledge of the language could quickly bring on suspicion and possible capture. Before considering disguise, the following must be understood:

(a) Under established international law, an evader is considered a belligerent until captured. As long as he wears his uniform, the evader is entitled to commit acts of violence against legitimate military targets without the risk of prosecution after capture for violation of local criminal law. This does not apply to an escapee. He can be tried and punished by local authorities for committing acts of violence in that area.

(b) Article 29 of the IV Hague Convention states that a persòn can be considered a spy when, acting clandestinely, he endeavors to obtain information in the operations of a belligerent and passes that information to a hostile party. Thus, uniformed soldiers, performing reconnaissance missions, are not considered spies.

(c) Members of armed forces lose their right to be treated as POWs when they deliberately conceal their status in enemy country to gather information or wage war.

(d) The evader should fully understand the prejudicial situation which could ensue from capture while disguised or wearing the uniform of the enemy. An almost insurmountable burden would be placed on him to show that he did not conceal himself for the purpose of gathering information or for waging war.

(e) Disguise must not be rejected entirely as those assisting his escape may order the evader to change clothing. If he does use a disguise, he should retain some type of military identification such as dog tags or ID card.

(5) Daylight Versus Night.--When feasible, travel should be accomplished at night; however, if the evader suspects that his location is known, he should move immediately. Whenever possible, during daylight hours, the evader should observe the terrain he will traverse, paying attention to the concealment it will provide and the obstacles he will have to cross.

(6) Maps.--If the evader has a map of the area, it should not be marked. A marked map in enemy hands can lead to the compromise of persons and locations where assistance was provided the evader. Soiled fingers will mark the map the same as a pencil. The evader must be careful not to touch the map with his fingers at the place where he has been or is going.

(7) Shelter.--Shelter such as abandoned houses, barns, and haystacks should be avoided as they will normally be the first place the enemy will search. However, the terrain and climate may be such that little choice is left to the evader.

(8) Obstacles.--The evader will be confronted with different kinds of obstacles which will impede him. These obstacles will either be natural or manmade.

(a) Natural Obstacles

1 Rivers and Streams.--The evader may have to cross rivers or streams either by swimming, boat, or some expedient. The enemy will normally have checkpoints and guards on bridges and ferries.

2 Mountains.--In many cases, mountains can be havens for survival. There will normally be good cover, food, water, and small population density.

(b) Manmade Obstacles

1 Road Nets.--Before crossing a road, it must be determined whether guards are present. If present, their location, route, time of movement, and field of visibility must be known. If a road is heavily patrolled, it should be crossed at night. When crossing a road, use all available cover to the road and then cross quickly and quietly.

2 Barbed Wire Fence.--To cross a fence, the evader should make sure it is not patrolled. He then slips through the fence while on his back by wriggling under the bottom strand of wire or between the bottom strand and the next one above. He must take care to avoid trip wires.

3 Concertina Wire.--This obstacle is usually mined and armed with trip flares and warning devices. To get through it, an individual must either crawl through it or go under the wire by propping it up and slipping under it.

4 Railroad Tracks.--The embankment or railbed is approached in a crouched position. A place is located that is the easiest to cross and where there is the most cover for hiding on the other side. Trip flares are likely to be found on the approaches to the tracks.

5 Minefields.--When in an area suspected of being mined, obtain some device for probing. Probe in an area wide enough to lie in. If in an area where there is good cover, probing in an area large enough for each foot will suffice. When probing, gently shove the probe into the ground at a 45-degree angle. Contact with a solid object indicates the presence of what must be assumed to be a mine. It is best to leave it alone and probe in another spot.

(9) Friendly Patrols.--The evader should be constantly on the alert for friendly patrols. When a patrol is spotted, he waits in position until it is close enough to recognize him.

When the patrol is near, he should wave a white cloth of some sort and call out in a language unmistakenly American.

(10) Friendly Outpost.--If unable to contact a friendly patrol, the evader may have direct approach to frontline positions. Here he will have to crawl through the enemy area to a point near a friendly forward element. This should be done at night. He should not make contact until there is enough light to see. The same procedures are used for contacting as when contacting patrols.

d. Short-Range Evasion

(1) General Aspects.--Since short-range evasion generally occurs in the forward combat zone or areas of hostilities, these areas are normally not too distant from friendly elements, giving the evader the advantage of distance and direction. This type of evasion usually occurs as a result of units and individuals becoming lost or separated from their parent units. All of the techniques discussed earlier apply to short-range evasion.

(2) Lone Evader.--A lone evader is an individual who becomes separated from his unit and must evade the enemy while finding his way back. He must be prepared for this eventuality ahead of time, both psychologically and materially. All evasion techniques apply here; however, he must be able to overcome fear and shock and be able to calmly take stock of the situation.

(3) Evasion in Counterinsurgency.--In this environment, there may be little distinction between friendly and enemy areas from one day to the next. There are generally no definite battlelines for the evader to guide on. Friendly forces may provide a measure of security throughout the country, providing shorter distances for the evader to travel. It must be assumed that the majority of the local population will be unfriendly and they should be

avoided. An evader is normally well oriented in relation to his present position in this situation, and he may assume that aircraft are friendly. An evader can expect little or no assistance from local neutrals since most of the population live in fear of the insurgent forces and their acts of terrorism, coercion, and atrocities. The evader may bring back valuable information on enemy activities during his trek back to friendly elements; however, he should not under any circumstances jeopardize personal safety or compromise cover to collect information. He should memorize what he observes but must not write anything.

5804. ESCAPE

a. General. --Snipers operating with patrols or other advance units might become isolated or wounded and as a result become captives of the enemy. Escape is the action taken to get away from the enemy when captured. Escape is most successfully accomplished soon after capture. When the feeling of panic and hopelessness that accompanies capture is shaken, the chances of escape are improved.

b. Alertness. --From the moment of capture, the driving thought of escape must be constantly in the mind. Many good escape opportunities are lost because the prisoner is too worried or depressed to consider them. Every moment must be evaluated for the chance it may present for escape.

(1) During Capture. --The chances are very good that when first captured, friendly frontlines are close by. Harsh treatment can be expected since the frontline enemy troops have reason for intense dislike. An individual can expect his watch, rings, boots, and other pieces of uniform to be taken from him as these may be luxuries to the captors. If close to friendly lines in a rather

fluid situation, an escape at this time is advisable. Many people have been prisoners for a short time, only to be released or found by their own advancing troops. At any rate, there will always be a much shorter distance to travel with an early escape. Also, friendly fire falling into the area may cause enough confusion among the captors to allow escape.

(2) Escort to the Rear. --It is a custom among most armies to use wounded troops to escort prisoners to the rear. A wounded guard is less likely to pay attention to his task than an unwounded one. Whether or not your guard is wounded, it is unlikely that he is adequately trained in handling prisoners. His inexperience is a big factor in the possible success of any escape attempt.

(3) Enemy Rear Area. --The longer an individual waits and the deeper he gets into enemy territory, the better the prisoner control will become. Experienced guards will be placed over him, and he will be enclosed in increasingly secure areas during halts. The longer he waits to escape, the better enemy security becomes, and he has less chance to readily slip away. In addition, his physical condition will be better during the initial stages of capture than at any other time.

c. Escape Methods

(1) In a Column. --As a prisoner is moved deeper into enemy territory, he may be placed in a larger group or prisoners. He might be moved on dirt roads in a column with two, three, or four abreast. This provides a good chance to escape. The word is passed quietly to stretch out the column and drag the feet. Stretching out the column increases the distance between guards and dragging feet will cause a cloud of dust. In this situation, it is not difficult to duck out of the column when an opportunity arises.

(2) In a Truck. --At some stage, the prisoner will undoubtedly be moved by a truck convoy. Though it takes some daring, escapes can be

effected from a truck in a convoy. The convoy is likely to stir up a cloud of dust that can cover an escape attempt.

(3) On a Train.--Escaping from a train depends on its construction. The prisoner may be able to go through a window or doors, or cut or pry his way through the floor or simply jump off a flat car. Although this type of escape is admittedly hazardous, there is the advantage that the train cannot be quickly stopped, and the escapee will have a head start before a chase can be made. Also, it is difficult to shoot a running man from a moving train.

(4) Prisoner Compound.--Most escapes are made from established prisoner-of-war compounds. The important thing for an individual to remember is that he is not defeated when placed in a large, organized wire enclosure, because many successful escapes have been made from such places. In almost all cases in past wars, Americans, as prisoners of war, were imprisoned in wire enclosures. Although maximum security prisons for POWs who were hard to handle did exist, most prisoners found themselves behind barbed wire fences, illuminated by powerful floodlights, and watched by sentries in towers. Generally, the three methods for the POW to get out of wire is through it, over it, and under it.

(a) Through the Wire.--Going through the wire can be construed as literally going through it by cutting or parting it. It also means an escape through the gates by devious methods. Prisoners have escaped by attaching themselves to working parties going through the gate and then slipping away. They have left compounds by various means of transportation. They have even walked out wearing uniforms of guards.

(b) Over the Wire.--Escapes have been made over the wire by improvised ladders and even by climbing the wire itself. The escapee must

try to select a blind spot and attempt this type of escape under cover of a diversion some distance away and during inclement weather or diffused light conditions.

(c) Under the Wire.--Possibly the escape requiring the most time, ingenuity, and skill is that of tunneling under the wire. A tunnel has a big advantage in that it is relatively secure until the prisoners make their actual break for freedom. However, a tunnel requires the utmost of coordination as well as cooperation, because people are required not only to dig, but also to disperse the dirt, watch for snooping guards, and manufacture various forms of equipment used in the tunnel. A tunnel is a great morale builder, because the pleasure of anticipation of escape increases as the work progresses.

(5) Approval to Escape.--Before attempting any escape, the prisoner must first contact the escape committee and get approval. No escape of any sort may be attempted by any prisoner without the prior approval of the escape committee which is part of the covert compound organization. If he were to make an escape without first getting approval, he could easily jeopardize the chances of another group who, unaware of his plans, might be escaping at the place of his diversion. Another very important reason for contacting the escape committee is the assistance they can provide in the escape plans. After a period of time, the committee gains a great deal of information and experience which is valuable to an escapee. Escape committees in WWII did a tremendous job of forging documents, manufacturing disguises, making escape rations, and fabricating various other types of escape gear.

5805. DESTRUCTION OF EQUIPMENT

a. General.--Snipers are equipped with

several highly specialized items of ordnance and optical instruments peculiar to their mission. This equipment could cause friendly troops trouble and casualties if it inadvertantly fell into the hands of an enemy, since most armies use captured equipment. It is therefore necessary for the sniper to destroy his equipment if its capture is imminent.

b. Optical Instruments.--Destruction of items such as binoculars, observation telescopes, and rifle telescopes present little problem. They are items in use by all armies and are not considered classified material. The chief concern is their reuse by the enemy. Smashing the lenses and prisms prevent their use, and bending, denting, or crushing the tubes will prevent their repair.

c. Weapons.--Rifles are generally well constructed, and though they can be disabled, a capable ordnance man can usually place them back in service. Therefore, it is necessary for the sniper to remove the bolt and take it with him. He must then attempt to bend or crack the receiver of the rifle against a rock, tree, or other solid object. The stock should be broken and the trigger mechanism smashed. If possible, the bolt should be dismantled and the parts disposed of in water or mud to prevent their being found.

d. Night Firing Devices.--Special efforts should be made to completely destroy infrared or Starlight night firing devices. If no other means of destruction is possible, the scope should be placed on end in a hole and a shot fired through the entire length of it. Image intensifier tubes, oscillators, and light source assembly should be destroyed and, if possible, carried away and disposed of in deep or murky water or in soft mud.

e. Burning.--If thermite grenades are available, position the grenade on the telescope and receiver assembly and pull the pin. Ensure that optics, image intensifier tube, or light source and the bolt and receiver are destroyed.



ARM-AND-HAND SIGNALS

Section I. ARM-AND-HAND SIGNALS

6101. GENERAL

Employment of snipers in support of infantry units requires the sniper to be thoroughly familiar with arm-and-hand signals used by the infantry. A properly given arm-and-hand signal is considered an order or command to be obeyed instantly. All standard arm-and-hand signals are listed in FMFM 6-5, Marine Rifle Squad. The stringent requirement of maintaining camouflage discipline and the avoidance of all movement and noise dictates the necessity of adopting additional arm-and-hand signals for use by the sniper team. These additional arm-and-hand signals are not intended to satisfy the requirements of every situation in which a signal is necessary but to

A



YOU

B



OBSERVE

C



NEGATIVE

D



AFFIRMATIVE

Figure 68. --Sniper Arm-and-Hand Signals.

E



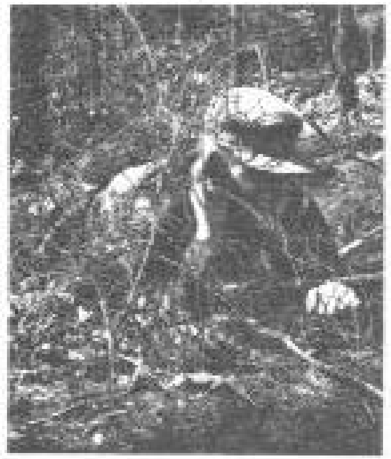
RADIO

F



I, ME, MY

G



LISTEN

H



I CANNOT SEE

Figure 68. --Sniper Arm-and-Hand Signals (continued).

establish a basis from which a complete inventory of arm-and-hand signals may be developed.

6102. SNIPER ARM-AND-HAND SIGNALS

a. Purpose.--The purpose of this section is to standardize certain essential arm-and-hand signals for use by sniper units throughout the Marine Corps.

b. Special Arm-and-Hand Signals.--Assuming that most special arm-and-hand signals will be conveyed from firing positions and that camouflage discipline must be maintained, all signals emphasize minimum movement and are given from the prone position. A thin monofilament line or piece of communication wire may be strung between snipers and used to attract attention. Figure 68 shows a sufficient number of signals to enable the sniper to form simple, basic sentences by combining several different signals. For example, by combining figure 109a, b, and h, a sniper has conveyed the message, "YOU OBSERVE, I CANNOT SEE."



CHAPTER 7

SNIPER EMPLOYMENT

Section I. CONCEPT OF EMPLOYMENT

7101. GENERAL

a. Importance.--The importance of the sniper and his rifle cannot be measured alone by the number of casualties he inflicts upon the enemy. Realization of the sniper's presence instills fear in enemy troops and influences their decisions and actions.

b. Capability.--A sniper team enhances a unit's firepower and augments the varied means of killing the enemy. The attachment of a sniper team to any unit provides that unit with an additional supporting arm. The sniper team's role is unique in that it is the sole means by which a unit can engage point targets at distances beyond the effective range of the service rifle. This

role becomes more significant when the target is entrenched or positioned among harmless civilians. The fires of automatic or crew-served weapons in such situations might result in the wounding and/or killing of innocent persons.

7102. FACTORS AFFECTING EMPLOYMENT

Sniper employment will change considerably from one war to another, from one geographical location to another, and from one tactical engagement to another, but certain basic factors relative to proper and intelligent employment of snipers remain constant. These factors closely parallel the considerations for employment of any supporting arm and strict adherence to them will produce better results and enhance economy of manpower. These factors are:

a. Employment as Teams. --Snipers are trained to operate in teams of two. As a team they can maintain continuous observation over an area; they can assist one another in shooting by averaging their range estimations, by observing each other's fire, and by offering adjustment information; and one can protect the other while he is preparing a position, and while he is eating or sleeping.

b. Strength. --The number of teams participating in an operation is dependent upon availability, anticipated opposition, and the expected duration of the operation. It is better to employ snipers in relays, in a few key positions, than to use all available teams simultaneously.

c. Terrain and Weather. --The sniper's assigned area of operations must allow clear fields of fire. He cannot be used effectively in terrain which denies observation.

d. Infantry Support. --In some environments, the sniper team is highly vulnerable to

detection and attack, and may require the automatic weapon capability of infantry support for self defense.

(1) Terrain. --When required to operate in daylight, in predominately open terrain, the sniper team should be accompanied by infantry troops. The sniper team then works from patrol bases located at the nearest available concealments from the positions of observation.

(2) Counterinsurgent Environment. --The sniper team may be required to operate in areas where it is impossible to escape detection by indigenous persons whose loyalties are unknown. In such cases, infantry support must be available to defend the snipers against attacks initiated by informers.

7103. OPERATIONS

a. General. --Each type of operation has certain characteristics that dictate slight differences in the technique of sniper employment. The commander's plan will set forth his decision to use snipers and will assign sniper missions for execution in accordance with established techniques for that type of operation.

b. Types of Operations. --Snipers may be employed effectively in any of the following operations:

(1) Offensive
- (a) Offensive, general.
- (b) Tank-infantry operations.
- (c) Mechanized infantry attack.
- (d) Attack of fortified areas.
- (e) Attack of built-up areas.
- (f) River-crossing operations.
- (g) Patrolling.
- (h) Extended ambush.

(i) Helicopter insertions.

(2) Defensive

(a) Defensive, general.
(b) Security forces.
(c) Area defense.
(d) Perimeter defense.
(e) Reverse slope defense.
(f) Defense of built-up areas.
(g) Defense of a river line.
(h) Mobile defense.
(i) Retrograde operations.

Section II. EMPLOYMENT IN OFFENSIVE OPERATIONS

7201. SNIPER'S ROLE

a. General.--Infantry units, acting independently or as parts of larger forces, conduct offensive movements to contact, close with, and destroy the enemy. Snipers provide the infantry commander with an additional means of accomplishing his mission. They are capable of detecting and shooting long-range targets which could otherwise impede the progress of the offense.

b. Tasks Common to All Offensive Operations.--The tasks of snipers in the offensive role include:

(1) Supporting the infantry by delivering accurate, long-range fire at:

(a) Enemy automatic weapons emplacements or embrasures.

(b) Enemy artillery forward observers.

(c) Enemy personnel.

(d) Enemy optical devices used for observation purposes.

(e) Fleeing enemy personnel during the consolidation and exploitation phase.

(2) Protecting the flanks of attacking units.

(3) Covering by fire, gaps between attacking elements.

(4) Participating in repelling counterattacks.

7202. OFFENSIVE COMBAT

The ultimate purpose of offensive action is the destruction of the enemy's armed forces,

imposition of the commander's will on the enemy, or the seizure of key terrain necessary to further operations. Snipers have a key role in the accomplishment of the overall mission which becomes increasingly more important as contact becomes imminent.

7203. MOVEMENT TO CONTACT

a. General. --Movement to contact is a tactical movement to gain contact with the enemy. The intent may be to establish initial contact with him or reestablish contact which has been lost. The movement to contact is terminated when physical contact with the enemy is gained or when the march units cross the line of departure.

b. Movement. --Snipers may conduct the movement to contact attached to the infantry battalion headquarters or attached to a company. The movement may be a covered or an uncovered movement.

(1) An uncovered movement is made by the leading elements of a force with the mission of gaining contact. Information of the enemy may or may not be available from friendly ground units to the front. Reconnaissance by the advancing units must be intensified to compensate for a lack of security elements provided by other forces. The uncovered movement ends when contact is gained or when information concerning the enemy warrants launching an attack. During an uncovered movement, sniper teams may be assigned anywhere that their observation capability can be used. The following assignments are considered appropriate during an uncovered movement:

(a) As members of a reconnaissance team on critical terrain features along the axis of advance.

(b) As security in areas where

there is a probability of ambush.

(2) A covered movement to contact is made when adequate security is provided by other forces. It normally ends when an assigned location is occupied and it is usually an administrative move.

c. Sequence of Movement. --The movement to contact is made in route column, tactical column, or approach march.

(1) Route Column. --Where enemy contact is remote, the movement is made administratively in route column. Units need not be grouped tactically and may move by various means over different routes. No specific sniper tasks are assigned during this phase. The route column regroups tactically when the commander's estimate of the probability of contact changes from remote to improbable. Maximum emphasis is placed on ease of control and speed of movement.

(2) Tactical Column. --When the probability of contact with the enemy changes from contact remote to contact improbable, units within the column are tactically grouped and adequate security to the front, flanks, and rear of the column is provided. The following units constitute security for the main body:

(a) Advance Guard. --The advance guard precedes the main body and provides for uninterrupted advance. It protects against observation and surprise by the enemy. The advance guard is subdivided into a point, an advance party, and a support. Flank security is assigned by both the advance party and the support. Snipers normally accompany the advance guard. They may be with the support unit or any of the subordinate security elements.

(b) Advance Party. --The advance party is deployed forward by the advance guard and constitutes the reconnoitering element for the

support. It provides its own point and flank security and is capable of coping with minor resistance. Snipers augment the observation capability of the advance party and also provide long-range fire at targets of opportunity. The mobility required of security elements and the terrain often precludes employment of other supporting arms. Sniper teams might very well constitute the only supporting arm available to engage long-range targets.

(c) Point. --The point is a small detachment sent forward by the advance party to give warning of enemy activity. Sniper teams may accompany the point to provide additional observation and firepower. Snipers should always augment a normal size point element; they should never be substituted for riflemen.

(d) Rear Guard. --The rear guard consists of a rear point and the rear party. The rear guard has no support and is large enough to protect the rear of the tactical column. Assignment of sniper teams to the rear guard is dependent upon the terrain, probability of enemy contact, and the priority of need.

(e) Flank Guards

1 Each major subdivision of the march column establishes flank security. Flank guards move abreast of their subdivision and parallel to it. They occupy successive key terrain features which cover approaches to the line of march. The flank guard prevents the enemy from bringing effective fire or observation to bear on the main body and will engage the enemy as necessary.

2 The flank guard regulates its movement to the main body rate of march and must travel rapidly over great distances in shorter periods of time than the march column. Often the terrain over which they move is more difficult

than that of the march route taken by the column. Frequent relief of the sniper teams attached to the flank guard is necessary. The relieving sniper team stations itself ahead of the flank guard, covers the approach of the flank guard, and relief is effected as the flank guard passes through. Sniper teams support by fire and observation movement between successive intermediate objectives and key terrain features dominating likely avenues of approach into the flank.

(3) Approach March. --As the commander's estimate of the probability of contact with the enemy changes from contact improbable to contact imminent, the march column increases its readiness for combat. Units in the column are task organized and tactically grouped for immediate deployment from the march column. Tactical considerations in the organization of the column outweigh other considerations. Sniper teams attached to the advance guard may be withdrawn and integrated into the tactical organization. The decision will depend upon the situation in general and, more specifically, the determination of which assignment has priority in terms of anticipated need. The sniper squad or platoon leader constantly evaluates the situation and is responsible for planning and advising the commander on employment of the sniper teams.

7204. ASSEMBLY AREA

a. General. --The covered movement to contact normally terminates in the occupation of an assembly area where final preparation is made for the offense.

b. Organization. --Within the assembly area, elements of the unit are dispersed to reduce vulnerability to enemy fires. The unit takes advantage of all available cover and concealment,

and an all-around defense is established. Sniper teams are positioned for observation into those areas which are most likely to be occupied by enemy snipers.

c. Preparations.--In the assembly area, final preparations for combat are made. The sniper leader must ensure timely rotation of sniper teams conducting the defense to provide all hands with the opportunity to rest and prepare. Preparations include the following:

(1) Final coordination with the commander of the unit to which attached to clarify or amplify the sniper mission.

(2) Thorough cleaning and checking of all gear, particularly the telescope, telescope mount, and ammunition.

(3) Drawing of rations and water.

(4) Application of camouflage.

(5) Obtaining of radio call signs and frequencies.

(6) Participation in rehearsals or training.

7205. FORMS OF MANEUVER

a. General.--There are four basic forms of offensive maneuver: frontal attack, envelopment, penetration, and the turning movement. The characteristics of the area of operations, the situation of the enemy, terrain, suitable avenues of approach, obstacles, and the enemy defensive posture influence the choice of maneuver.

b. Sniper Assignment.--Sniper teams may be assigned to the rifle company on a daily basis or for the duration of a specific operation. The company commander will assign their specific tasks. Sniper teams may also be assigned to battalion headquarters, under the operational control of the battalion commander.

7206. FRONTAL ATTACK

a. General.--The frontal attack is designed to achieve tactical success along an entire front. The purpose of the attack is to exert pressure along the enemy front and push him off the objective with superior combat power. (See fig. 69.)

b. Sniper Team Employment.--The basic offensive mission of a sniper team in a frontal

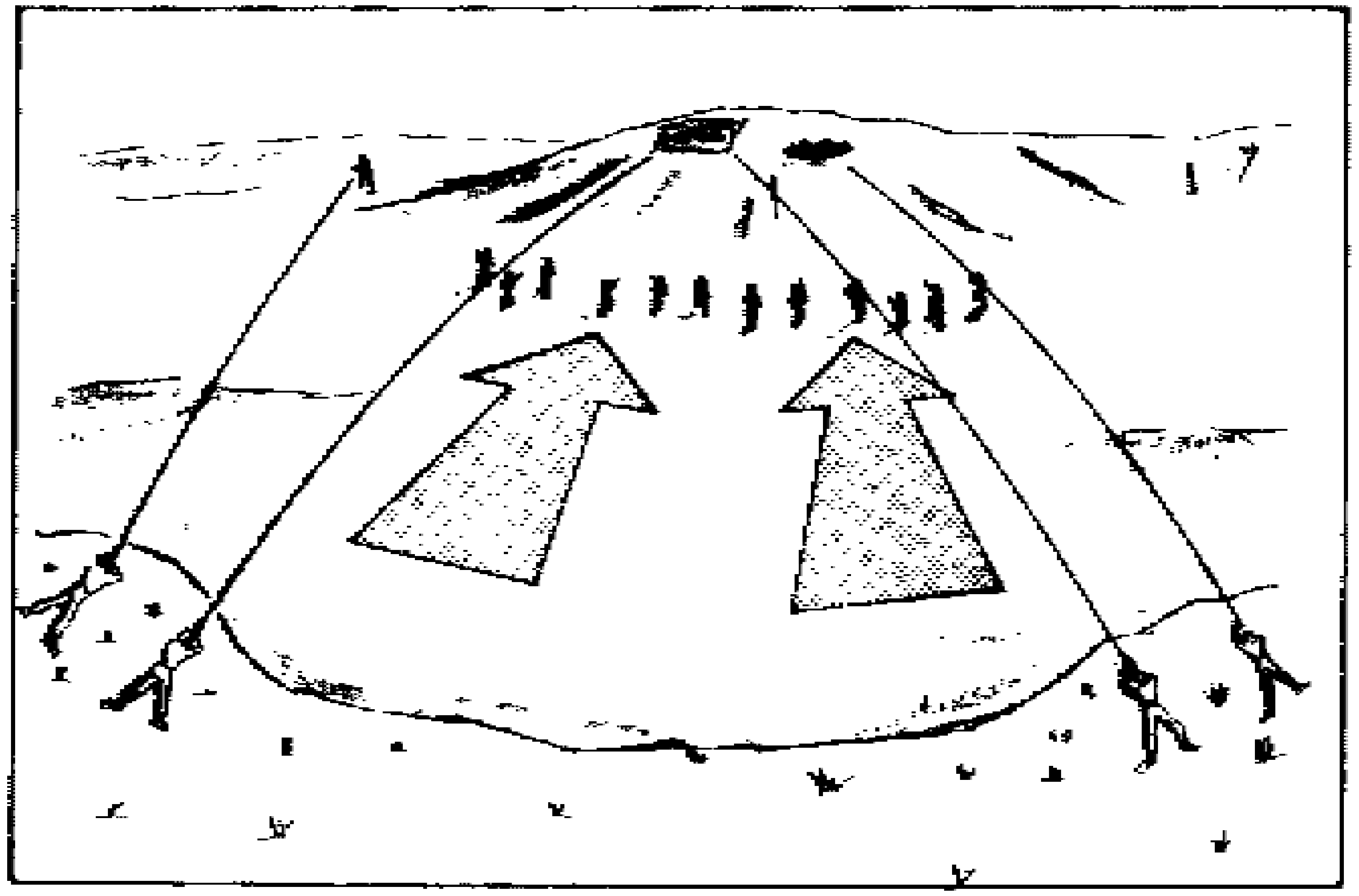


Figure 69.--Frontal Attack.

attack is to support the advance of the attacking infantry by precision fire. This is accomplished by:

(1) Directing fire from carefully concealed positions at exposed enemy troops.

(2) Delivering fire into embrasures in enemy bunkers.

(3) Destroying enemy crew-served weapons and crews.

(4) Delivering long-range fire at targets located beyond the objective but directly opposing the advance. (Firing is normally shifted to deeper targets when the maneuvering infantry masks the fire.)

(5) Providing flank protective fire at targets threatening an exposed flank or at small, isolated resistance pockets which have been bypassed.

(6) Assisting in consolidation and exploitation by firing at targets threatening a counterattack or firing at fleeing enemy personnel.

c. Priority of Targets.--Snipers should primarily be assigned specific point targets. The sniper team cannot engage all known or suspected enemy positions. In such cases, it will be necessary to successively neutralize enemy weapons or personnel having the greatest effect on accomplishment of the mission.

d. Requirements for Firing Positions.--During the attack, the sniper team's primary position should be one which enables the snipers to cover the entire front of the objective and as much of the rear of the objective as possible. An alternate position should be preselected for occupation in case enemy fire makes the primary position untenable. Supplementary positions are required when it is anticipated that snipers may be required to engage other targets in addition

to or in lieu of the primary targets. All three positions should offer as many of the following characteristics as possible:

(1) Clear fields of fire.

(2) Cover and concealment.

(3) Observation of as much of the objective area as possible.

(4) Sufficient height to preclude premature masking of fire by advancing friendly troops.

e. Displacement

(1) When the assault begins and fires are masked, the sniper team displaces as rapidly as possible to new positions to continue support of the attack.

(2) If the tactical situation requires uninterrupted fire and targets are still evident to the rear or flank of the objective, the sniper team will displace by echelon. One sniper will continue to provide supporting fire while the other moves forward to a newly selected position. Upon assumption of the new position, the other sniper will rejoin the team.

7207. ENVELOPMENT

a. General.--In the envelopment, the main attack is directed against the enemy flanks or immediate rear while a supporting attack exerts pressure along his front to fix him in position. There are two types of envelopment: the single envelopment and the double envelopment. The concept of sniper team employment is the same for both.

b. Sniper Team Employment.--The basic offensive mission of a sniper team in an envelopment is to support the enveloping unit or units by precision fire. This is accomplished by:

(1) Directing precision fire from

carefully concealed positions in the vicinity of the unit or units conducting the supporting attacks.

(2) Preventing the enemy from physically reinforcing the area in which the main attack is being conducted by delivering precision fire at enemy reinforcements.

(3) Engaging the targets as outlined in paragraph 7206b.

c. Requirements for Firing Positions.--During the envelopment, the best position from which to support the main attack is in the vicinity of the supporting unit. Although it is recognized that the greatest concentration of fire support is normally allocated to the main attack, the potential of the sniper rifle is best exploited in the support role. Attachment of the sniper team to rapidly moving assault units would not provide adequate time for establishing good firing positions from which to support the attack. The ideal firing position permits full fire to the front to deceive the enemy as to the true location of the main attack and also provides a field of fire into the area of the main attack.

d. Firing.--As the enveloping unit is maneuvering, snipers deliver precision fire at exposed targets to the direct front. As the enveloping unit nears the final coordination line, sniper fires are shifted to the area of the main attack. As the main attack nears the assault position, supporting fires are normally ceased or shifted to permit the momentum of the assault to carry it through the objective. Snipers, however, continue to provide precision fire at targets which appear upon cessation of the supporting fires. Extreme caution is exercised to prevent possible ricochets and injury to friendly personnel. Fires are shifted as the main attack starts through the objective.

e. Displacement.--As the main attack

secures the objective, sniper teams are displaced forward. They are positioned within the defensive posture to pursue the enemy by fire and assist in repelling counterattacks.

7208. PENETRATION

a. General.--A penetration is an attack through some portion of the enemy's position and is directed against an objective to his rear. It is characterized by an initial attack on a wide front to fix the enemy and deceive him as to the location of the main attack. The main attack is a powerful violent attack in considerable depth, launched on a narrow front.

b. Sniper Team Employment.--The concept for employment of sniper teams during a penetration is similar to that for an envelopment. Snipers contribute to the accomplishment of the mission by directing the bulk of their fires into targets opposing the main attack.

c. Requirements for Firing Positions.--The penetration is initially supported from sniper positions, located near the area of the intended breakthrough, which provide the essential elements of a good position as outlined in subparagraph 7206d.

d. Firing.--Prior to the attack, snipers engage targets directly opposing the main attack. Particular emphasis is placed on enemy observers and embrasures in bunkers which threaten the attack. As the attack commences, exposed enemy personnel are taken under fire. When the breakthrough occurs, fires are shifted to targets falling back as the penetration is widened.

e. Displacement.--After the penetration is effected, sniper teams displace forward to support exploitation of the area immediately adjacent to the penetration. They are then in position to pursue

the enemy by fire or assume firing positions to support an attack upon objectives to the rear of the enemy lines.

7209. TURNING MOVEMENT

a. General.--In the turning movement, the main attack passes around the main enemy force and seeks to secure an objective deep to the rear. Coincident with the maneuver of the main attack, a supporting attack exerts pressure on the front to divide his attention. The purpose of the turning movement is to compel the enemy to abandon his positions or divert major forces to meet a new threat to his rear.

b. Sniper Team Employment.--The wide separation between the supporting unit and the unit conducting the main attack necessitates attachment of sniper teams to each element. If sufficient sniper teams are not available, the priority of attachment should be to the unit conducting the main attack. The considerations governing firing positions, firing, and displacement are similar in all respects to those exercised in other forms of maneuver.

7210. TANK-INFANTRY OPERATIONS

a. General.--Tanks are employed with infantry in a balanced tank-infantry team to exploit the mobility, firepower, speed, and shock action of the tank. Sniper teams provide long-range protection for the tanks from concealed enemy antitank weapons and their crews and tank-killer teams. Further assistance is rendered the tank element by observing and detecting tank targets and marking them with tracer rounds.

b. Employment Limitations.--The speed of tanks requires sniper teams to make frequent displacement forward in order to remain within support range. Terrain poses an additional limitation upon the effectiveness of sniper support. As the tanks move forward, fires are frequently masked by hills or other prominent terrain or manmade features.

c. Sniper Team Employment.--Snipers are effectively employed in the support of tank-infantry operations only when desirable employment conditions exist. Desirable employment conditions are defined as "any tactical situation in which the terrain does not mask or otherwise restrict the effective application of fire." Targets which can be effectively engaged by the sniper team are taken under fire and destroyed. Those targets which are invulnerable to small arms fire are destroyed by tank fire. Snipers mark targets for tanks at ranges up to 900 meters by tracer rounds. Active sniper team employment commences with the movement from the assembly area and continues through the consolidation phase.

d. Methods of Employment.--The infantry commander uses any combination of three methods of attack in employing tanks. The three methods are: same axis, converging axes, and support by fire.

(1) Same Axis.--When maneuver, visibility, and fields of fire are restricted, tanks and infantry usually advance together in mutual support. Sniper teams occupy positions along the axis of advance which permit maximum observation and field of fire into the area immediately to the front and flanks of the tanks. (See fig. 70.) The telescope, adjusted to high magnification, will readily detect the presence of enemy antitank positions and tank-killer teams which may be invisible to the tank-infantry team. Sniper observation is concentrated on terrain just beyond that which can

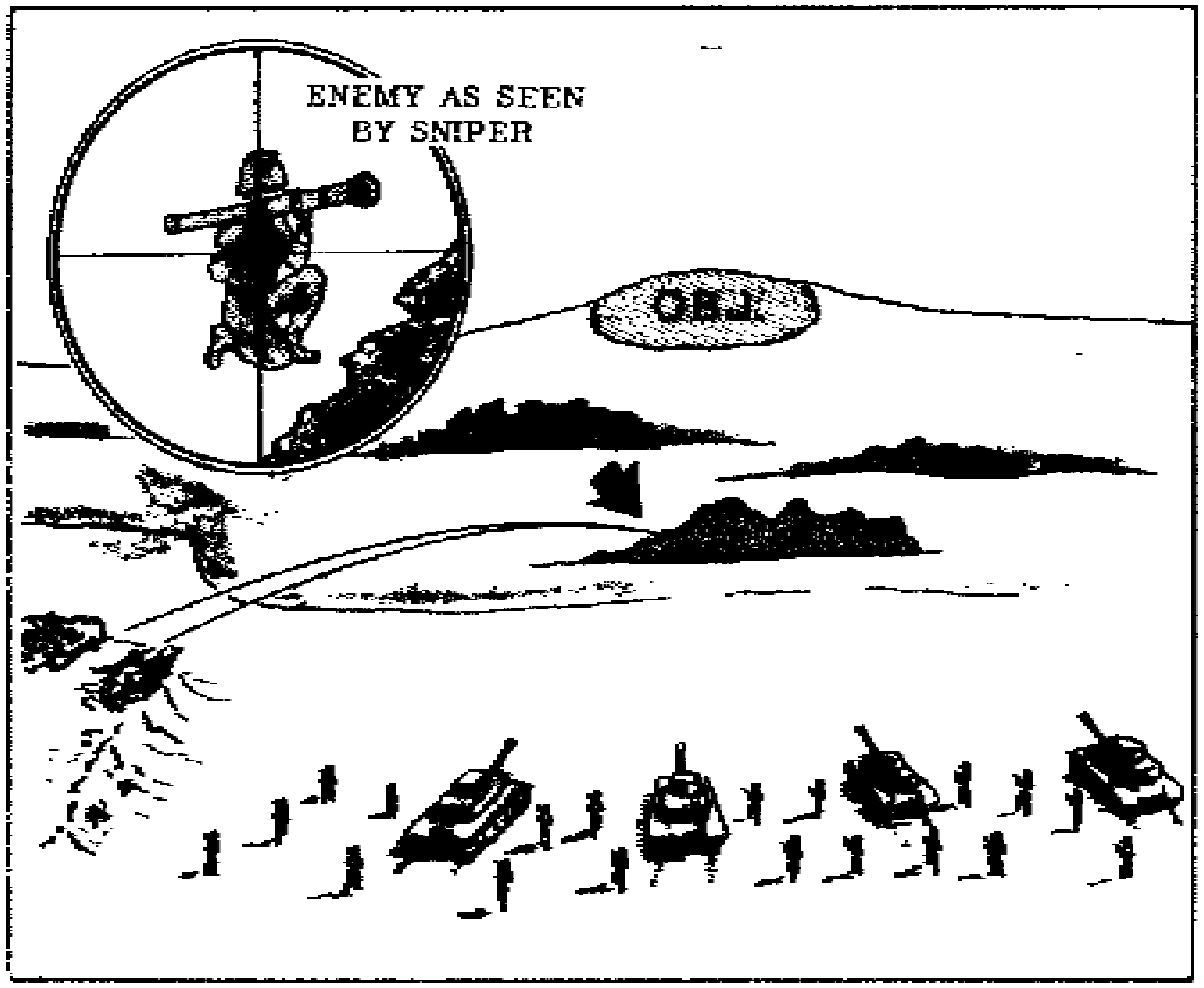


Figure 70. --Snipers in Support of Tanks.

be easily seen by the advancing tank-infantry team. This technique of tank-infantry employment permits close coordination and maximum mutual support between tank and infantry but sacrifices the speed and mobility of the tanks. Consequently, sniper teams need not displace forward as often as when the tanks are alone. Sniper displacement should be by echelon to preselected locations to provide continuous support. As the tank-infantry team nears the objective area, increased enemy resistance becomes likely. Consequently, sniper teams must plan to be in a firing position from which they can

effectively support the final stages of the assault.

(2) Converging Axes. --Separate axes are used by tanks and infantry to approach the objective. Normally, the tanks will follow the terrain most appropriate for their employment while the infantry follows a route offering cover and concealment. If the terrain permits, snipers are attached in direct support of the tank movement augmenting a minimum size force of infantry. Rapidly moving tanks will normally preclude the assumption of stationary firing positions. The sniper team will follow in trace of the tanks, taking advantage of every opportunity to stop, observe, and detect concealed targets for the tanks. During the assault, the sniper team supports the operation by precision fire from positions which provide maximum observation and fields of fire. Upon occupation of the objective, they participate in the consolidation phase.

(3) Support by Fire. --The support by fire method consists of an infantry attack which is supported by tank fire from stationary positions. It is considered the least desirable method of attack and is used only when conditions preclude assault by tanks. If the distance from the supporting tank position to the objective is within the effective range of the sniper rifle, snipers will normally be attached to the tank element to provide protection and additional observation for the tanks, mark targets with tracer rounds, and to deliver precision fire at targets of opportunity. If the tanks are beyond the effective range of the sniper rifle, the commander may leave the sniper team in support of the tanks, place them in a position between the tanks and the objective, or attach them to the infantry in a conventional role.

e. Plan of Attack. --The plan of attack embodies a scheme of maneuver and a fire support plan, developed concurrently, based on an

estimate of the situation.

(1) Scheme of Maneuver. --A sniper team representative should be present to conduct a joint reconnaissance with the infantry and tank commander if the situation permits. The sniper representative makes appropriate sniper employment recommendations based upon the indicated scheme of maneuver.

(2) Fire Support Plan. --The sniper teams' unique capabilities play a significant and prominent role in the fire support plan of a tank-infantry team. Fires must be planned to protect the tanks from tank-killer teams and known or suspected antitank positions. Fires to protect and cover tank movement are particularly important when the tank must traverse over terrain not previously uncovered by the infantry. The observation and precision fire capability of the sniper team lend invaluable assistance to the commander in formulating a tank-infantry fire support plan.

7211. MECHANIZED-MOTORIZED ATTACK

a. General. --The infantry unit is mechanized when it is supported by amphibious vehicles and tanks for the purpose of conducting land combat. Mechanized infantry operations are characterized by rapid mounted movement to an area forward of the line of departure for subsequent continuation of the attack on foot. Movement is made by the infantry mounted in amphibian tractors and supporting tanks using the same or multiple axes. When movement is by multiple axes, priority of sniper attachment is to the amphibian tractor element. Mechanized infantry attacks are organized to accomplish one or more of the following missions:

(1) Rapid seizure of deep objectives.

(2) Envelopment and seizure of enemy positions.

(3) Pursuit and/or cutoff of withdrawing enemy.

(4) Exploitation of higher echelon successes.

b. Sniper Employment. --The rapid movement during the initial stages of mechanized infantry attack limits active sniper employment in support of the tank-tractor column. Sniper support, therefore, will be limited to periods when the armored grouping is halted and to the infantry attack subsequent to dismounting.

(1) Employment During Movement. --Sniper teams are normally embarked in the lead, center, and rear amphibian tractors. During voluntary administrative halts or involuntary halts due to enemy action, sniper teams debark immediately and assume firing and observation positions.

(2) Employment After Dismounting. --The infantry unit commander designates an area forward of the line of departure in which attacking platoons dismount from tractors to continue the attack on foot. The dismount area should be a concealed or covered area, if possible, and it should be located as far forward as the terrain and the enemy situation permit. Immediately after dismounting, sniper teams are deployed, if time permits, in the immediate area to provide long-range observation and precision long-range support fires if enemy targets appear. Upon commencement of the attack on foot, employment is in accordance with conventional offensive tactics.

c. Consolidation. --After seizing the objective, the attacking force consolidates the position. Sniper teams are positioned to augment the observation and support fire capability of the tanks and amphibian tractors which are positioned for

flank and rear security. As in the tank-infantry attack, the availability of firepower on the objective may permit rifle units to be withdrawn to covered positions for reorganization. Close-in protection requirements for the tanks and amphibian tractors are met in part by retention of sniper teams on the objective.

7212. ATTACK OF FORTIFIED AREAS

a. General. --Fortifications provide a base for offensive operations or a series of strong defensive positions for the protection of vital areas. Fortified works of some nature are invariably constructed when military forces have a defensive mission. Depending upon the time and resources available for their construction, they range in complexity from simple, hastily prepared log or earth bunkers constructed from locally available materials, to permanent concrete and steel emplacements with fixed embrasures or steel turrets, intricate underground passages, and elaborate troop quarters. The fluidity of modern war normally limits opposing forces to the use of field fortifications constructed from locally available materials. These may include fortified weapons emplacements or bunkers, protected shelters, reinforced natural or constructed caves, entrenchments, and obstacles. Normally, emplacements and bunkers are mutually supporting and disposed in width and depth. The precision fire and observation capabilities of the sniper team are considered invaluable in the attack of fortified areas.

b. Special Considerations. --The attack of a fortified area is usually difficult and requires special considerations. The enemy's cover,

prepared obstacles, defensive fire plan, and carefully prepared counterattack plans give him definite advantages. For these reasons, fortified areas are usually bypassed by the main force and contained by a minimum force. There are, however, certain disadvantages in defending a fortified area which the sniper must exploit whenever possible. These weaknesses include:

(1) Lack of Mobility. --Bunkers and emplacements cannot be relocated or altered to meet new threats or changing situations.

(2) Openings. --Emplacements are weakest near embrasures, air vents, observation posts, and doorways. These various openings are vulnerable to precision fire.

(3) Lack of Visibility. --A single embrasure in an emplacement can cover only a small sector of observation and fire. Lack of visibility makes one emplacement depend upon another for support. The neutralization of each emplacement makes the defense progressively less effective.

c. Sniper Team Employment. --Snipers employed in an attack on a fortified position are normally assigned the primary mission of delivering precision fire into observation posts, embrasures, and at exposed personnel. Targets are engaged selectively to ensure systematic reduction of the enemy's defenses through destruction of his mutual support capability. Penetration is the usual form of maneuver for attacks on fortified positions and snipers are employed accordingly.

d. Position Requirements. --The sniper team establishes a position as close as possible to the area to be penetrated. Positions should be on the flanks of the zone of action. This permits continuous fire support not only for the assault

units, but for adjacent units as well.

e. Fire Support Plan. --The fire support plan of the infantry unit commander assigns specific tasks to snipers based on intelligence of:

(1) Exact locations and extent of individual fortifications.

(2) Locations and numbers of embrasures, fields of fire, and types of weapons therein.

(3) Locations of entrances, exits, and air vents in each emplacement.

(4) Directions of fire and types of fixed weapons.

(5) Extent of underground fortifications.

(6) Locations of natural and artificial obstacles.

(7) Locations of weak spots in the defense.

f. Consolidation. --Upon capture of the objective, sniper teams displace forward to new positions from which to support a continuation of the attack or assist in repelling counterattacks.

7213. ATTACK OF BUILT-UP AREAS

a. General

(1) Attack. --The attack of a built-up area is divided into three phases:

(a) Phase I. --Phase I is designed to isolate the battle area by seizing terrain features which dominate the approaches to it. Snipers deliver long-range precision fire at targets of opportunity.

(b) Phase II. --Phase II consists of the advance to the built-up area and the seizure of a foothold on its edge. It is during this period that snipers displace forward and assume their initial positions from which to support continuation of the attack.

(c) Phase III. --Phase III consists of the advance through the built-up area in accordance with the plan of attack.

(2) Special Considerations. --The nature of attack on built-up areas may vary from one of complete destruction to a requirement for capture without major damage. In the former case, artillery will play the major role, and the sniper will be mainly involved only in consolidation. When the area is to be preserved, however, sniper fire will play a very significant part in the advance and special consideration must be given to the factors of control and terrain as they affect the employment of snipers.

b. Control. --The advance through a built-up area will frequently consist of many separate and apparently independent actions. Control becomes decentralized and communication efficiency is lowered because of radio failure due to surrounding structure. In this situation, the sniper teams must have a very clear picture of the scheme and progress of maneuver if they are to provide timely and effective support.

c. Terrain. --The terrain of a built-up area is, of course, entirely artificial and radically different from that of any other type of operation.

(1) Observation Areas and Fields of Fire. --Observation areas and fields of fire are clearly defined by streets and highways, but the surveillance problem is tremendously complicated by the possibly hundreds of rooftops, windows, and doorways, each of which is a separate and distinct point for observation.

(2) Cover and Concealment. --Built-up areas offer excellent cover and concealment for both attackers and defenders. The defender has a decisive advantage, however, because the

attacker must expose himself to move through the area. The sniper has a very distinct advantage because he does not necessarily have to move to the most advanced line. He may occupy a higher position to the rear or flanks some distance away from his unit.

(3) Avenues of Approach. --The best avenues of approach are the building interiors since movement through the streets is so easily detected. Snipers, whether attacking or defending in built-up areas, must learn every possible avenue of approach in their areas of operation.

d. Sniper Employment

(1) Assignment. --Sniper teams should operate in each zone of action, moving with and supporting the infantry units. They should operate at sufficient distance from the riflemen to keep from getting involved in fire fights but close enough to kill more distant targets which threaten the advance. Some sniper teams should operate fully independent of the infantry on missions of search for targets of opportunity and particularly for enemy snipers.

(2) Positions

(a) Mutual Support. --In built-up areas, it is desirable that team members operate from separate positions. Detection of two men in close proximity is very probable, considering the wealth of positions from which the enemy may be observing. The snipers should locate themselves where they can provide mutual support.

(b) Camouflage and Cover. --Fields of fire are obvious to the enemy, and he will be well aware of likely sniper locations. Camouflage and cover under such circumstances are very difficult, but the resourceful sniper will find ways to remain unnoticed.

1 Firing From Windows. --When firing from a window, the sniper should,

if possible, fire from a position back in the room. The sound will be muffled and the muzzle flash will not be noticed. If he must show his rifle or part of his body to make the shot, he should abandon that position after firing.

2 Loopholes. --Instead of firing through windows or doorways, the sniper can gouge out of the wall a funnel shaped hole with the large end at the room's interior. Such a hole is inconspicuous, a poor target, and allows a considerable sector of fire.

3 Missed Shots. --The sniper should always abandon a position from which he has fired two or three misses. His detection is almost certain.

4 Traffic. --The sniper's position must never be subjected to traffic of other personnel, regardless of how well the sniper is hidden. Traffic will invite observation, and the sniper may be detected by optical device. He must abandon the position rather than risk detection.

7214. RIVER-CROSSING OPERATIONS

a. General

(1) The purpose of a river-crossing operation is to move an attacking force rapidly across a river obstacle so that it may continue its attack to seize assigned objectives. Sniper teams, by virtue of their observation and precision fire capability, are uniquely adaptable to the initial stages of the river crossing.

(2) There are two types of river crossings: hasty and deliberate.

(a) Hasty Crossing. --A crossing is termed hasty when it can be conducted as a continuation of the attack, with a minimum loss of momentum, by the same large forces which

executed the advance to the river line. It is characterized by speed, surprise, and minimum concentration of personnel and equipment.

(b) Deliberate Crossing.--The deliberate crossing is characterized by some delay, more detailed preparation, and the employment of extensive and specialized crossing means.

b. Concept

(1) The effectiveness of the river as an obstacle is reduced through surprise and deception, speed of attack, and rapid buildup of combat power on the opposite shore.

(2) River crossings are normally made on wide fronts to facilitate dispersion, rapidity, and deception.

(3) When possible, assault units cross in helicopters and/or amphibian vehicles to seize deep objectives. When helicopters or amphibian tractors are not available, assault units cross in boats or by constructed bridges. In this case, they are assigned objectives close to the river.

c. Sniper Employment

(1) General.--Snipers are employed effectively in general support prior to and during the crossing.

(a) Prior to the Crossing.--Sniper teams assume positions across the total width of the crossing area with the primary mission of observation. All sightings of enemy activity are immediately reported to higher authority.

(b) During the Crossing.--During the crossing, sniper teams support the crossing by observation and suppression of the enemy's observation and fire. The precision fire capability of the sniper team makes continuous fire support possible up to the time the landing is effected and the troops commence movement inland.

(2) Planning

(a) The sniper team leader should conduct a joint reconnaissance with the infantry unit commander to determine the number of sniper teams necessary to support the crossing. Snipers must be placed in position as early as possible, preferably during the reconnaissance stage. The time of sniper displacement across the river for support of the continuation of the attack must be preplanned. Generally, displacement commences immediately after the first troops have reached the opposite shore.

(b) In the event helicopters are used for deep assault, a priority of sniper need is established for helicopterborne and surface units. If sufficient sniper teams are available, they should be attached to both elements.

(3) Crossing in Boats.--Boat crossings are generally made during periods of reduced visibility. Limited employment of snipers during night boat crossings is possible providing a full moon exists or artificial illumination is utilized. When crossings are made during periods of reduced visibility, sniper fire support must be lifted earlier than usual to prevent accidental shooting of friendly troops.

(4) Firing.--During the actual crossing, snipers hold their fire, to preserve secrecy, unless targets appear which threaten the operation.

7215. PATROLLING

a. General.--A patrol is a detachment sent out from a unit to perform an assigned mission of reconnaissance or combat, or a combination of both. Patrolling is one of the surest means of establishing and maintaining security, gaining information, and contacting, harassing,

or damaging the enemy. The effective employment of sniper teams with any size or type patrol is limited only by the terrain and the ingenuity and imagination of the patrol leader. The succeeding paragraphs are not intended as a complete source of information on all aspects of patrolling but rather to define the sniper's task and responsibilities as they relate to patrolling in general. It is essential that snipers acquire a thorough knowledge of all aspects of patrolling. Detailed information is found in FMFM 6-4, Marine Rifle Company/Platoon, and FMFM 6-5, Marine Rifle Squad.

b. Types of Patrols.--Patrols are classified by the type mission performed. The two general classifications are combat and reconnaissance. Their principal difference is in the action at the objective.

(1) Reconnaissance Patrols.--Reconnaissance patrols collect or confirm information. They are organized into a reconnaissance element and a security element. The reconnaissance element reconnoiters or maintains surveillance over the objective. The security element secures the objective, rallying point, gives early warning of enemy approach into the objective area, and protects the reconnaissance element. Missions that may be assigned a reconnaissance patrol include the following:

(a) Point Reconnaissance.--A reconnaissance conducted to collect information about a specific location or a small specified area, usually a known position or activity.

(b) Area Reconnaissance.--A reconnaissance conducted within an area defined by boundaries or other limiting features. The reconnaissance unit is given maximum freedom of action within the assigned area.

(2) Combat Patrols.--Combat patrols

are organized to perform the following missions:

(a) Raids.--A raid patrol is a surprise attack for the purposes of destroying enemy installations and equipment, killing enemy personnel, capturing enemy personnel and equipment, or liberating personnel. Raids are conducted by small forces which rely upon surprise and coordination for success. Raids are frequently conducted at night or in bad weather to enhance the factor of surprise.

(b) Economy of Force Actions.--Economy of force patrols establish roadblocks to slow enemy movement, seize key terrain to deny enemy access to an area, cover a withdrawing friendly force, and block enemy interference with larger friendly offensive actions. The economy of force action differs from a raid in that it retains its objective.

(c) Security.--When a security patrol detects the enemy, it functions as a raid patrol to capture or kill or, in the case of a large enemy force, the security patrol will provide delaying action. In a moving situation, security patrols screen flanks, areas, and routes. In a static situation they prevent the enemy from infiltrating the area, detect and destroy infiltrators, and prevent surprise attack.

(d) Contact.--Contact patrols establish or maintain contact with the enemy or between friendly forces. A contact patrol is organized and armed according to knowledge of the enemy situation and the size of his forces in the area. The contact patrol must be capable of overcoming screening forces in order to contact main forces.

(e) Ambush.--Ambush patrols carry out surprise attacks from concealment against an enemy party which is moving or at a temporary halt. Enemy patrols, carrying parties,

foot columns, trains, or vehicle convoys are some ambush objectives.

(f) Search and Attack. --A search and attack patrol is a patrol with the general mission of seeking out and attacking targets of opportunity. This patrol is a combination reconnaissance and combat patrol which searches for, and within its capability, engages targets when and where found. Engagement is by raid, ambush, or any form of attack suitable to the situation.

c. Sniper Employment in Patrols

(1) Reconnaissance Patrols. --Generally, only one sniper team is attached to a reconnaissance patrol when it is assigned a point reconnaissance. If the patrol has an area or zone reconnaissance or surveillance mission, two or more teams may be attached. The snipers normally remain with the security element to provide long-range protection for the reconnaissance element. If terrain conditions permit, the long-range accuracy of the sniper rifle permits the reconnaissance element to patrol further away from the security element yet remain within effective support range. The comparatively slow rate of fire of the sniper rifle limits its practicality as an "all-around" weapon for use with the reconnaissance element. To prevent compromise of the reconnaissance team position, the sniper team fires only in self-defense or when ordered by the reconnaissance patrol leader. Normally, the only appropriate time to fire at a target of opportunity is when extraction or departure from the position is imminent and firing will not endanger the success of the patrol.

(2) Combat Patrols

(a) Raids. --The decision to employ snipers on a raid is influenced by the time of day the raid is to be conducted and the desired size of the patrol. If the raid is at night, the employment of snipers is impractical. When

maximum firepower is essential and the size of the patrol must be limited, snipers may not be included. If patrol size permits and long-range precision fire is needed, sniper teams should be attached. The sniper team is normally attached to the security element. If appropriate, the sniper team may be attached to the support element to assist in providing long-range supporting fires. When attached to the security element, the sniper team assists in observing, in preventing enemy escape from the objective area, and in covering the withdrawal of the assault force to the rallying point. Upon withdrawal from the rallying point, the sniper team may be left behind for a short period to delay and harass enemy counteraction or pursuit.

(b) Economy of Force Patrols. --The sniper team is ideally suited for retarding enemy movement by the application of precision, long-range fire from well-concealed positions. The enemy is taken under fire at the longest range practical under the existing wind, visibility, and terrain conditions. As the enemy nears, the sniper teams become increasingly selective and concentrate on killing leaders, radiomen, and crew-served weapons personnel.

(c) Security, Contact, and Search and Attack Patrols. --The sniper teams move with the main bodies of these patrols. They are not used as points because of their inability to deliver volume fire. If the patrol is taken under fire, the sniper team immediately assumes a firing position and attempts to locate the enemy with the aid of the rifle telescope and binoculars. The sniper team continuously estimates the range to areas from which there is a likelihood of being ambushed. Sight settings are changed to correspond with the estimated range to expedite retaliation in the event they are fired upon.

(d) Ambush Patrols. --Sniper

teams are positioned in areas which afford observation and fields of fire into terrain features which might afford the enemy cover after the ambush has been initiated. To provide maximum coverage of the ambush site, sniper teams should be located at both ends of the ambush. The long range of the sniper rifle enables the sniper team to position themselves away from the main body. The fires of the sniper team are coordinated into the fire plan. When the signal to commence fire is given, snipers join in the volume of surprise fire. The sniper seeks leaders, radio operators, and crew-served weapons personnel as primary targets. If the enemy is mounted in trucks, every effort is made to kill the drivers of lead and end vehicles to block the road, prevent escape, and to create confusion. Upon cessation of fire, snipers may be retained in position long enough to cover withdrawal of the ambush unit.

7216. EXTENDED DAYLIGHT AMBUSH

a. General. --An extended daylight ambush is an ambush conducted exclusively by snipers from preselected positions in areas where there is a likelihood of encountering the enemy. It is employed to isolate areas within the battle area by restricting enemy movement, to create fear and confusion among enemy troops, and to gain information.

b. Selection of Ambush Areas. --Air observers, intelligence reports, and patrols are prime sources of information in determining advantageous locations for ambushes. Trails, river crossings, routes of communication, and main supply routes are considered likely areas in which to encounter the enemy. Generally, the ambush is established within the effective support range of artillery. If it is established in areas of

heavy enemy activity and the routes to and from the sniper team position are not conducive to rapid and concealed movement, infantry troops should accompany the snipers. The size of the supporting infantry element will be determined by degree of enemy activity anticipated. The fewer personnel involved, the less likely detection will be.

c. Selection of Specific Ambush Site. --When the general area has been established, a specific position from which to fire must be selected. The position should possess the following characteristics:

(1) Maximum observation of the objective area.

(2) Fields of fire.

(3) Covered routes of ingress.

(4) Natural camouflage.

(5) Cover.

d. Sniper's Employment. --When the decision has been made to employ sniper teams in a certain area, the sniper team coordinates the anticipated ambush with the unit to which attached or the unit which has tactical responsibility for the proposed area. Matters to be discussed and/or coordinated will include: coordinates of ambush sites, time and routes of departure and return, passwords and countersigns, radio frequencies and call signs, fire and infantry support matters, and time and routes of friendly patrols in the area.

(1) Preparation. --Prior to departure, the sniper team, after briefing, should make a detailed checklist of preparatory actions and follow it systematically to ensure full readiness.

(2) Departure. --Departure to an objective area should commence during the hours of darkness to ensure that the sniper team is in position prior to first light. Rigid patrol discipline is maintained en route.

(3) Arrival at Ambush Site.--Immediately upon arrival at the ambush site, the area must be thoroughly and quickly reconnoitered. Positions must be established and made comfortable, hasty fields of fire cleared, and foliage gathered for camouflage. The firing position must be made usable prior to daylight. Dirt excavated from the position is disposed of by placing it in sandbags which will be used as protection and a rest upon which the rifle will be steadied.

(4) Requirements of a Firing Position.--The sniper team's firing positions are located to provide maximum coverage of the entire area, consistent with the team concepts of mutual support and alternating the firing and observing duties. Darkness will make selection of mutually supporting positions difficult; however, every effort must be made to prepare the position as thoroughly as possible, even under the most adverse conditions.

(5) Conduct of the Mission.--At first light, both members of the sniper team observe. During the early morning and at dusk, the enemy has a tendency to become careless and will expose himself. Also, enemy activity will increase at first light. Range cards are prepared as quickly as possible after daybreak. Prominent terrain and manmade features are compared with the map as an aid in determining ranges. A determination is made, from observation of the terrain, of where the enemy is most likely to appear. Wind values are estimated and compared continuously throughout the day. This procedure expedites setting off a shot when a target appears. It is absolutely essential that the sniper team remain alert but motionless during the day.

(a) Shooting.--When a target appears, a determination must be made whether or not to fire. Only targets that are positively

identified as the armed enemy and are clearly defined are fired upon. Indiscriminate firing at poorly defined targets only serves to compromise the security of the mission. Both snipers aim in on the target as it appears; however, only one shoots. If the first sniper misses, the second sniper has the option of shooting or "calling the shot" for his partner who then adjusts his sights for the next shot or "holds off" and shoots again if the target is still exposed. If large bodies of troops appear, an artillery mission should be called down upon them.

(b) Evasive Action.--If the sniper team fires, a decision must be made whether to remain in position or move. At long ranges it is difficult to determine the exact origin of a rifle shot; however, repeated shots disclose the position. After shooting, the sniper team must be particularly alert for enemy movement or unusual activity. If activity is oriented towards their position and a covered route of withdrawal is available, it is better to move. If the firing position is, by virtue of its features, an obviously probable sniper position, the sniper team should displace. However, the original position should be held as long as possible if there is no unusual enemy activity after firing. Movement will increase the probability of detection.

(c) Departure.--Departure from the sniper position is executed during darkness to avoid detection. Every effort is made to restore the position to its natural state so that the area may be used again.

7217. HELICOPTER INSERTION

Helicopters may be used to insert sniper teams into areas of operation when:

a. The selected sniper position is located an excessive distance from friendly lines.

b. The situation requires immediate employment.

c. The route to a selected sniper position is unduly difficult or heavily saturated with the enemy.

d. It is desired to create an adverse psychological effect upon the enemy by killing key personnel deep in enemy controlled areas.

e. There is a requirement for sniper fire to support a helicopterborne assault or to secure terrain around a landing zone.

f. Required for diversionary actions or in response to ambushes of friendly forces.

Section III. EMPLOYMENT IN DEFENSIVE OPERATIONS

7301. GENERAL

a. Purpose of the Defense. --The defense is the employment of all means and methods available to prevent, resist, or destroy an enemy attack. It is a posture assumed by a force for the purpose of defeating enemy offensive action. The mission in the defense may be to deny a vital area to the enemy, to protect a flank, to contain an enemy force, or to affect maximum attrition and disorganization upon the enemy. The defense may be assumed for one or more of the following purposes:

(1) To allow development of more favorable conditions for undertaking the offense.

(2) To economize forces in one area in order to concentrate superior forces for decisive offensive action elsewhere.

(3) To permit the employment of nuclear weapons.

(4) To ensure the integrity of an objective seized during the attack.

b. Sniper's Role in the Defense. --This section introduces the fundamentals of defensive combat as they pertain to snipers and the sniper's role in varied defensive situations. Its purpose is to explain how the sniper's capabilities may be effectively employed to enhance or augment a unit's defensive fire plan. Detailed information on defensive tactics is found in FMFM 6-4, Marine Rifle Company/Platoon, and FMFM 6-5, Marine Rifle Squad.

7302. FUNDAMENTALS OF DEFENSE

The defense of any position is planned, organized, and conducted by applying certain fundamentals. These fundamentals do not have

equal influence nor are they equally emphasized at different levels of command. Further, they may not apply to the same extent in different situations. The commander of the unit to which snipers are attached decides the degree to which snipers will participate in the defense. After an analysis of the terrain, snipers submit recommendations to the unit commander on employment and positions.

a. Utilization of Terrain. --The sniper must always take maximum advantage of the terrain by occupying positions which offer good observation, fields of fire, concealment and cover, and which controls enemy avenues of approach into the defensive position.

b. Security. --The sniper team must adopt security measures to offset the attacker's advantages of initiative and flexibility, and to cause him to attack under unfavorable conditions. Every conceivable measure is taken by the sniper team to avoid ground observation and surprise from any direction.

c. Mutual Support. --Sniper teams are positioned so they can coordinate surveillance and reinforce each other by fire.

d. All-Around Defense. --Snipers organize for defense in all directions by establishing a system of primary and supplementary positions.

e. Defense in Depth. --Snipers are positioned in depth throughout the defense to ensure sustained sniper fire support. Snipers positioned near the forward edge of the battle area (FEBA) are vulnerable to concentrated attacks because of their limited volume of fire.

f. Coordinated Barrier Planning. --Barrier planning includes considerations for the employment of a series of natural and artificial obstacles to restrict, delay, block, or stop the movement of enemy forces. Snipers cover obstacles by precision fire.

g. Coordinated Fire Planning. --All

defensive fires are carefully planned and provide for the following:

(1) Bringing the enemy under fire as soon as he comes within effective range.

(2) Delivering increasingly heavier fires as the enemy approaches the battle area.

(3) Breaking up the assault by fires immediately in front of the battle area.

(4) Destroying the enemy or ejecting him by fires within the battle area should he succeed in penetrating it.

h. Rate of Sniper Fire. --The rate of sniper fire does not increase or decrease as the enemy approaches. Specific targets such as officers, NCOs, and radio operators are systematically and deliberately destroyed without sacrificing accuracy for speed.

7303. COVERING FORCE

A covering force is normally established to provide security forward of the general outpost for a specified period to provide time for the preparation of defensive positions, to disorganize the attacking enemy forces, and to deceive the enemy as to the location of the battle area. Sniper teams are assigned to covering forces in strength to augment their fires.

7304. GENERAL OUTPOST (GOP)

a. General. --The general outpost warns of enemy approach and provides time for the forward forces to prepare positions in the battle area. It covers the withdrawal of reconnaissance forces when they are operating to the front. It prevents observation of the battle area and delays the enemy advance.

b. Sniper Employment. --Snipers are assigned to general outposts to provide long-range

precision fire to cause premature deployment of advancing enemy forces and to augment the outpost's observation capability.

7305. COMBAT OUTPOST (COP)

a. General. --The combat outpost is a security echelon consisting of a series of outguards covering the foreground of the positions of the regiment in the battle area. Its mission is similar to that of the general outposts. Additionally, the combat outpost provides target information for fire support agencies. The strength and composition of the combat outpost will vary; however, it should always be augmented by a minimum of one sniper team.

b. Organization. --The forces on the combat outpost are disposed laterally in a series of outguards varying in strength. The outguards are positioned near the topographical crest of terrain offering long-range observation and fields of fire covering the avenues of approach into the battle area. Sniper teams are placed in positions which offer the best long-range fields of fire and observation into areas which are not covered by fire or observed by other outguards.

c. Withdrawal Plan. --When the general outpost withdraws, the combat outpost commander deploys patrols forward to gain and maintain contact with the enemy. The withdrawal plan is prepared and coordinated with the frontline units concerned. It also provides for an orderly withdrawal of the outguards on predetermined routes to successive delaying positions. The plan provides for extensive employment of snipers during this period to cover the withdrawal.

7306. SECURITY

a. Local Security. --Local security consists

of sentinel posts, patrols, and listening posts. Sniper teams may be assigned any task involving local security during daylight hours.

b. Flank Security. --Exposed flanks are secured by locating reserves to block principal avenues of approach. Sniper teams enhance all-around security by providing long-range observation and precision fires.

7307. AREA DEFENSE

a. General. --The area defense is a relatively compact defense in its basic form and is characterized by a strongly-held forward defense area. The basic fundamentals of defense as they apply to the sniper are applicable to all the variations of the area defense.

b. Extended Defense. --The extended defense is a variation of the area defense which stresses depth and flexibility through the withholding of a large reserve. Forward forces are widely separated and provide mutual support. Generally, the smallest forward units separated beyond mutually supporting distances are infantry battalions.

c. Linear Defense. --Linear defense is a variation of the area defense requiring a maximum employment of forces forward with a small reserve. It is characterized by strong mutual support between forward units, limited depth, and minimum flexibility. The linear type defense is employed when defending a wide area.

d. Perimeter Defense. --A perimeter defense is a variation of the area defense which disposes a unit to meet an attack from all directions simultaneously. See paragraph 7309 for a discussion of sniper's positions and employment in the perimeter defense.

7308. SNIPER EMPLOYMENT IN AREA DEFENSE

a. General. --When sniper teams are

attached to any unit to augment the unit's defensive posture, their employment is directed by the commander's plan of defense. The unit commander in making his reconnaissance, designates sniper positions which will support his defensive scheme. He considers the terrain, the capability of the rifle, the elements of a desirable sniper position, and the mission to be assigned the sniper.

b. Sniper Assignment.--The sniper team may be assigned a role with the forward elements or with the reserve element. The requirements of a good position generally favor assignment to the reserve unit.

(1) Forward Elements.--If the requirement to provide adequate protection of the FEBA is paramount, sniper teams are positioned slightly to the rear of the frontline rifle units to avoid enemy fire directed at the frontline units. The sniper team is assigned the responsibility for defending critical avenues of approach and for firing at targets of opportunity.

(2) Reserve Elements.--The unit commander considers the retention and positioning of a reserve, consistent with the requirement for adequate forces to defend the FEBA. The sniper team, when assigned to the reserve unit, supports the FEBA units by fire, protects key terrain features in the rear, and controls the most dangerous approaches through the battle area. The sniper teams' observation capability is ideally suited for assignment to security and surveillance missions with the reserve unit.

c. Fire Support Plan.--Sniper fires are planned and coordinated along with the fires of all other organic and supporting arms. Initially, the sniper team subjects the enemy to long-range precision fire. If the enemy succeeds in penetrating the area, the sniper shifts his fire to targets of opportunity within friendly positions to help contain the penetration and support the counterattack.

Fires are coordinated with adjacent sniper units to ensure overlapping fields of observation and fire.

7309. PERIMETER DEFENSE

a. General.--Since this type defense has many of the characteristics of the other area defense variations, only the peculiarities of the perimeter defense are discussed in this paragraph.

b. Sniper Employment.--Maximum emphasis is placed upon mutual support within the perimeter. The generally circular trace of the FEBA makes it difficult to employ snipers as a team. The team may be split to gain increased coverage of the area or to cover several critical avenues of approach into the perimeter.

c. Sniper Position.--Ideally, the sniper team is positioned on rising terrain near the center of the perimeter providing the position provides all-around observation of avenues of approach and good fields of fire. The position should also be near the reserve element's position to facilitiate support of the reserve unit in the event of a counterattack.

7310. REVERSE SLOPE DEFENSE

a. General.--A reverse slope defense is one organized on the portion of a terrain feature that is masked by a crest from enemy direct fire and ground observation from the front. All or any part of the forces on the FEBA may be on the reverse slope, depending on the terrain in the area to be defended. A successful reverse slope defense depends on control of the crest by fire or physical occupation. The unit commander may direct a reverse slope position to be occupied:

(1) When the forward slope is untenable because of enemy fire.

(2) When the forward slope has been

lost or not yet gained.

(3) When the terrain on the reverse slope gives better fields of fire than the forward slope.

(4) To avoid a dangerous salient or reentrant.

(5) When possession of the forward slope is not essential for observation.

(6) To assist in achieving deception and surprise.

b. Advantages. --In a reverse slope defense, the frontline platoons in the battle are protected from enemy ground observation and direct fire. Enemy indirect fire weapons normally must deliver unobserved fires which reduces its effectiveness. When the enemy has been deceived as to the true situation, he may advance to close contact before he realizes he has uncovered the battle area.

c. Disadvantages. --Two major disadvantages are the difficulty of maintaining observation of the enemy and the restricted range for direct fire weapons. Without observation, the effectiveness of friendly direct and indirect fires is limited. Obstacles and minefields on the forward slope cannot be covered by direct fire weapons. If the enemy seizes the crest, he has the advantage of attacking the battle area moving downhill while a counterattack to eject him must move uphill.

d. Sniper Employment. --The sniper team is positioned with the security group on or just forward of the topographical crest to provide long-range fire and observation. If a position on the topographical crest is not available, the sniper team should be located with the reserve unit on the next high ground to the rear of the FEBA from which they can support the frontline platoons by fire.

7311. DEFENSE OF BUILT-UP AREAS

a. General. --The considerations which affect sniper employment in the defense of a built-up area are very similar to those affecting an attack of a built-up area. An awareness of what the enemy is committed to do or what he can be expected to do in any given situation will facilitate the sniper's task.

b. Considerations. --There are several factors to consider in the defense of a built-up area. These factors are:

(1) The defense of localities constructed of inflammable material provide little protection and may become hazards.

(2) The cover and concealment available and the limited observation require special attention to an all-around defense and to measures for countering enemy infiltration.

(3) Added emphasis is placed upon barriers to deny the enemy ease of movement.

(4) Surveillance of the flanks and rear is intensified and a flexible defense must be developed to permit a defense in any direction.

c. Sniper Employment. --Snipers are preferably positioned in buildings of masonry construction which offer the best long-range fields of fire and all-around observation. They are assigned various missions which include:

(1) Countersniper fire.

(2) Firing at targets of opportunity.

(3) Denying the enemy access to certain areas or avenues of approach.

(4) Providing fire support over barricades and obstacles.

(5) Surveillance of the flanks and rear areas.

(6) Supporting counterattacks.

(7) Prevention of enemy observation.

d. Sniper Position. --The ideal sniper position is not necessarily located in close proximity to the frontlines. Buildings bordering both sides of a street minimize the effects of wind on the trajectory

of the bullet and permit the establishment of positions further away from the frontlines. Positions in inconspicuous, masonry buildings which afford a field of fire, observation, and routes of ingress and egress are ideal. Alternate or supplementary positions should also be established in built-up areas.

7312. DEFENSE OF A RIVER LINE

a. General. --Rivers consititute obstacles to an attack and natural lines of resistance for defensive and delaying action. The natural characteristics of a river; i.e, flat, unobstructed field of fire and known distance, are exploited by the sniper team to increase its capabilities. The defense of a river line is conducted using the same fundamentals employed in other forms of defensive combat.

b. Reconnaissance. --The defense of a river line requires thorough reconnaissance. The most probable crossing sites are determined so they can be defended in force. Main considerations are the banks, approaches to the banks, topography of adjacent terrain, and road nets on both sides of the river. An analysis of the foregoing will assist in determining probable enemy crossing sites and the best defensive positions.

c. Sniper Employment. --Snipers are initially employed with the covering force which remains on the enemy's side of the river to maintain contact with the enemy. Every effort is made to harass, delay his advance, and determine assembly positions and his probable crossing sites. When forced to retire, sniper teams move into predetermined positions on the friendly side of the river and assume a defensive posture.

d. Sniper Positions. --The sniper position should ideally be located as far above or below possible fording sites consistent with observation and fields of fire. If it is necessary to assume positions

directly across from the possible fording site, the position should be located as far back from the river line as possible to avoid enemy preparatory fires.

7313. MOBILE DEFENSE

a. General. --The purpose of a mobile defense is to destroy an attacking enemy. Minimum size forces are positioned in forward areas to warn of attack and block or impede the enemy advance or canalize it into preselected killing zones along the avenues of approach. The capability of the sniper to deliver long-range precision fire is invaluable to a mobile defense. The considerations and fundamentals governing defensive employment in general are applicable in the mobile defense.

b. Forward Forces. --The forward defense area is that portion of the division sector in which the forward defensive positions are located. Normally, the size of the forward defense area is based on considerations, such as the space required by units to function within their missions, the capability of the units to prevent infiltration, and their ability to maintain surveillance over the area.

(1) Strongpoints. --A strongpoint is normally a defensive position organized by a battalion or company in the forward defense area. Its mission is to slow down, divert, repel, or destroy the advancing enemy. It provides information from which the location of the enemy's main attack, strength, and direction of advance can be determined. Battalion or company strongpoints employ area defense. Although positions are primarily oriented to defend against attacks from the front, strongpoint reserves must prepare numerous supplementary positions to which troops may be moved rapidly to meet a threat from any direction. Maximum emphasis is placed on the fundamentals of all-around defense and flexibility. Strongpoints may also employ a perimeter defense,

of the bullet and permit the establishment of positions further away from the frontlines. Positions in inconspicuous, masonry buildings which afford a field of fire, observation, and routes of ingress and egress are ideal. Alternate or supplementary positions should also be established in built-up areas.

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particularly those established by rifle companies.

(a) Blocking or Impeding. --If the mission is to block or impede, a unit organizing a strongpoint may adopt a formation suited to hold specific terrain. It must be capable of carrying out its mission even when isolated for limited periods.

(b) Canalizing Enemy Movement. --When the mission is that of canalizing enemy movement, the strongpoint is organized so it can maintain observation and fire on the approaches into its position. The strongpoint may organize a series of blocking and delaying positions throughout its area in accordance with the overall plan for influencing the movement of the enemy force.

(2) Sniper Employment. --Snipers should be assigned to any size unit assigned the mission of establishing strongpoints. If a sufficient number of sniper teams are available, they should also be assigned to the strongpoint reserves to cover withdrawal of the strongpoint. The highly mobile characteristic of the sniper is particularly adaptable to performing independent harassing and observation missions for the strongpoint forces.

7314. RETROGRADE OPERATIONS

a. General. --A retrograde movement is any movement of a command to the rear or away from the enemy. It may be forced by the enemy or it may be a voluntary movement. Such movements are classified as withdrawals, retirements, or delaying actions.

b. Purpose. --Retrograde movements are conducted to achieve one or more of the following purposes:

(1) Harass and inflict punishment upon the enemy.

(2) Draw the enemy into an unfavorable position.

(3) Permit the use of elements of a force elsewhere.

(4) Avoid combat under undersirable conditions.

(5) Gain time without fighting a decisive engagement.

(6) To disengage from combat.

c. Considerations. --The following factors are considered in all retrograde actions:

(1) Terrain is exploited to the maximum. Good observation and fields of fire are sought to permit engaging the enemy at long ranges. Maximum use is made of cover and concealment. Natural and artificial obstacles are used to the maximum. Emphasis is placed upon denying key terrain and avenues of approach to the enemy.

(2) Demolitions are employed and provisions are made to provide guards to prevent premature firing or seizure by the enemy.

(3) Plans and orders are normally issued in greater detail to offset the difficult nature of retrograde movements. The sniper must be aware of all plans and the concept of the operation. He should know the times of withdrawal and priority of forward units; control measures such as routes, assembly areas, covering positions, and rallying points; composition of forces; security measures; and the location of minefields.

d. Sniper Employment. --The foregoing considerations will apply to sniper employment in varying degrees. Essentially, however, snipers are assigned missions of supporting the action by delaying and inflicting casualties upon the enemy, observation, covering avenues of approach and obstacles by fire, harassing the enemy by causing him to prematurely deploy, and if the situation permits, directing artillery fire on large groups of the enemy. Provisions must be made for communications to facilitate control of the sniper's withdrawal and to call for fire if required.

APPENDIX A

SAFETY

1. GENERAL

The following paragraphs list the standard safety precautions to be observed during rifle marksmanship sniper training. They have general application and must be supplemented by local regulations governing the operation of specific facilities.

2. MECHANICAL TRAINING

Prior to conducting mechanical training, the following precautions must be taken:

a. All rifles will be cleared.

b. A careful check of dummy rounds will be made to ensure that no live ammunition is present.

c. Tool boxes, spare parts boxes, or other containers in the vicinity of the training area will be checked to ensure the absence of live ammunition.

3. RANGE FIRING

Prior to range firing, the following will be accomplished:

a. Each rifle will be inspected by an officer, NCO, or coach to ensure there is no obstruction in the bore. Upon completion of firing, each rifle will be inspected to ensure that all live ammunition has been removed from the weapon.

b. Except while being used to conduct live or dry fire exercises, all rifles will have bolts open and safeties locked to the rear in any area where live ammunition is being used or is available.

c. When carrying a rifle on the range, the

muzzle will be pointed upward and down range.

d. During live fire exercises, all rifles on the range will be presumed to be loaded so they must never be pointed at anyone or anything except the authorized targets.

e. During daytime live fire exercises, a red streamer will be displayed from a prominent location on the range.

f. Live firing will not be conducted until all prescribed roadblocks have been established and all necessary range guards posted.

g. Ammunition will be issued only on command from the officer/NCO in charge of the range.

h. Rifles will be loaded (or simulated loaded) only on command from the control tower.

i. Prior to firing, all individuals including range personnel will be informed of the safety limits of the range.

j. When not being used, rifles will be placed in the racks or in such a position as to be easily inspected to ensure bolts are open and safeties engaged.

k. Dry firing will not be conducted in the rear of the firing line unless supervised by an officer or NCO.

l. Personnel will not move forward of the firing line until given clearance by the officer/NCO in charge.

m. Anyone observing an unsafe condition during firing exercises is authorized to give the command, CEASE FIRING. When the command is given, it will be relayed immediately to the control tower who will command, CEASE FIRING. The range officer is then responsible for investigation of the unsafe condition and necessary corrective action.

4. PIT OPERATION

The safety procedures used in the pits are as

follows:

a. The command to commence firing will not be given until clearance has been received from the pit officer/NCO.

b. Target operators will remain at their targets unless they have been granted permission to leave by supervisory personnel.

c. No one will leave the pits until clearance has been granted by the officer/NCO in charge of the range.

d. Target operators must not expose any part of their bodies above the protective berm while marking or otherwise handling the targets and target frames.

5. EXERCISES WHICH REQUIRE MOVEMENT OF SHOOTERS

a. During any exercise requiring shooters to move with loaded rifles, safety NCOs or scorers will accompany the shooters to ensure their proper alignment and that rifle muzzles are pointed down range at all times.

b. If a rifle fails to fire during a movement exercise, the shooter must move forward when so directed regardless of whether or not he has cleared the stoppage.

c. Safety NCOs will enforce safety regulations to include inspecting weapons upon completion of firing to ensure that they can be safely removed from the firing line.

APPENDIX B

SYLLABUS, SNIPER TRAINING

1. PURPOSE

The purpose of this appendix is to provide uniform guidance in the conduct of sniper training in Marine Corps units.

2. OBJECTIVE

The objective of this syllabus is to instill in the individual sniper the military knowledge necessary for service with a Fleet Marine Force unit in the field.

3. GENERAL TRAINING NOTES

This syllabus is a guide for preparing training schedules. Training problems peculiar to a given unit or installation may necessitate modification or improvisation of some of the training outlined herein.

a. The practical exercises should include a situation with several requirements involving individual and/or team actions covering the fundamentals of the subject being taught.

b. Where feasible, opposing forces' concept should be used for realism in training. Example: Train one or more sniper squads in defense while training others in offense.

c. Separate exercises may be combined into a continuous tactical exercise where logical training situations can be portrayed. For example, combine a night reconnaissance patrol with a dawn attack on an enemy outpost with long-range sniper fire.

d. A critique should be held after each phase

or requirement of the problem to discuss good and bad points. A general critique to emphasize the principles involved should be held at the conclusion of each problem.

e. Hours of instruction allotted in this syllabus for each subject are maximum, the total hours may be reduced by concurrent training; however, THERE ARE NO SHORT CUTS IN MARKSMANSHIP TRAINING. Therefore, when additional training hours are available, emphasis should be on the marksmanship phase of sniper training.

4. SYLLABUS OF INSTRUCTION

Subject	Code	Hours
Introduction to Sniper Training		1
General	L	(1/4)
Sniper Organization	L	(1/2)
Selection of Personnel	L	(1/4)
TOTAL HOURS		1
Sniper Equipment		1 3/4
Rifles	L, D	(1/2)
Telescopes	L, D	(1/2)
Rifle and Telescope Assemblies	L, D	(1/4)
Ammunition	L, D	(1/4)
Special Equipment	L, D	(1/4)
TOTAL HOURS		1 3/4
Care and Cleaning of Equipment		1 1/2
Rifles	L, D, A	(1)
Optical	L, D	(1/4)
Special Equipment	L, D	(1/4)
TOTAL HOURS		1 1/2

Subject	Code	Hours
Marksmanship		62 1/2
Sighting and Aiming	L	(1/2)
Sling Adjustments and Positions	L, D, A	(2)
Trigger Control	L	(1/2)
Sight Adjustments	L, D, A	(2)
Effects of Weather	L	(1)
Zeroing	L	(1/2)
Position Exercises	A	(8)
Range Practice Firing	A	(40)
Range Record Firing	A	(8)
TOTAL HOURS		62 1/2
Target Detection		10
	L, D	(2)
	L, A	(8)
TOTAL HOURS		10
Range Estimation		8
	L, D	(1)
	L, A	(7)
TOTAL HOURS		8
Holds and Leads		8
	L, D	(1)
	L, A	(7)
TOTAL HOURS		8
Intelligence Collecting and Reporting		3
	L	(1)
	L, A	(2)
TOTAL HOURS		3

Camouflage and Concealment		8
	L, D	(4)
	L, A	(4)
TOTAL HOURS		8

Individual Movement		8
	L, D	(2)
	L, A	(6)
TOTAL HOURS		8

Survival, Evasion, and Escape		8
	L, D	(1)
	L, A	(7)
TOTAL HOURS		8

Sniper Employment		85
Introduction to Employment	L	(1)
Offensive Operations	L, A	(6)
Defensive Operations	L, A	(4)
Special and Auxiliary Operations	L, A	(2)
Field Exercises	A	(72)
TOTAL HOURS		85

KEY: L - Lecture
D - Demonstration
A - Application

RECAPITULATION

Subject	Total Hours
Introduction to Sniper Training	1
Sniper Equipment	1 3/4
Care and Cleaning of Equipment	1 1/2
Marksmanship Training	62 1/2
Target Detection	10
Range Estimation	8
Holds and Leads	8
Intelligence Collection and Reporting	3
Camouflage and Concealment	8
Individual Movement	8
Survival, Evasion, and Escape	8
Sniper Employment	85
TOTAL HOURS	204 3/4

APPENDIX C

SNIPER QUALIFICATION COURSE

1. GENERAL

The Sniper Qualification Course outlined herein is general in nature to the extent that it does not limit the amount of concurrent training that can be integrated into the qualification course. For example, if facilities exist to conduct a combination target detection and range estimation exercise concurrently with the qualification course, it should be accomplished and graded. The qualification course may be fired throughout the training period for practice at the discretion of the sniper platoon commander. Record firing, however, should be conducted near the end of the Sniper School.

2. OBJECTIVES

The objective of the Sniper Qualification Course is to establish a standard level of individual proficiency for snipers throughout the Marine Corps.

3. FIRING EXERCISES

a. Field Firing

(1) Sniper Equipment. --In addition to normal combat equipment, each sniper will be equipped with a sniper rifle and binoculars.

(2) Range Organization

(a) General. --Considering the magnitude of the sniper range requirement in relation to the number of snipers to be trained and the time required to conduct such training, it will probably be necessary to superimpose this facility over a range designed for other type training. Consequently, the target arrangement and the requirements for range

and safety officers, safety NCOs, and other supervisory and support personnel must be based on the type of facility available and the number of snipers to be trained.

(b) Location and Size of Range. --Ideally, a sniper range should be located on terrain which has been left in its natural state. The range should be 1,000 meters in depth, if possible, but not less than 600 meters. There should be several sniper positions along the firing line to provide different perspectives of the target area.

(c) Targets. --The target used in all exercises is fabricated from a standard "F" target by cutting down to the dimensions as shown in figure 71. The portion of the target above the neckline is considered a "hit" at all ranges up to 400 meters. At ranges beyond 400 meters, the entire target is used to score a hit. Targets should be

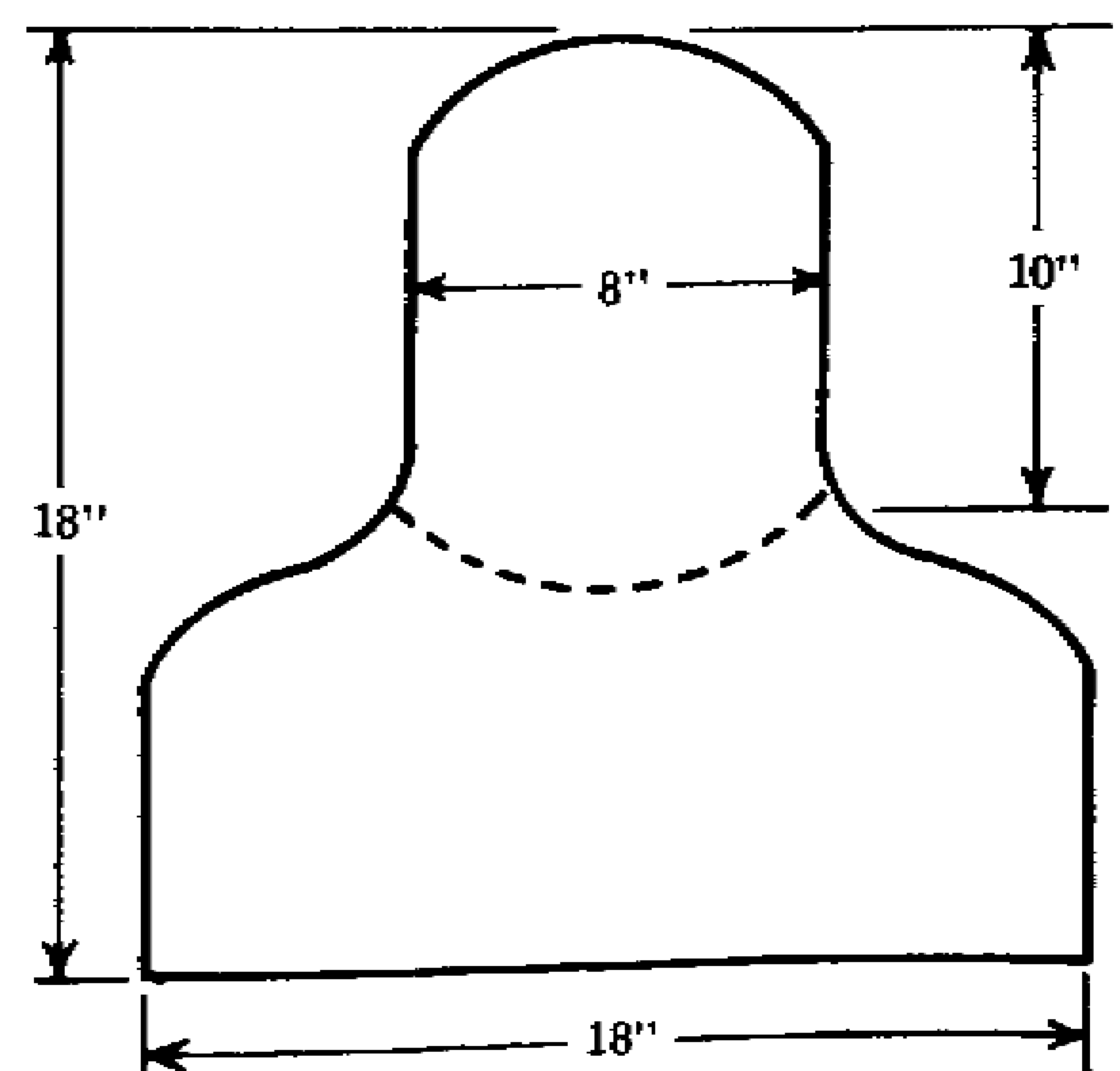


Figure 71. --Modified "F" Target.

arranged to provide different degrees of concealment at various ranges. Automatic pop-up targets provide the most efficient range operation; however, field expedient type devices may be constructed and operated from pits. In the event that pop-up targets are not available, the modified "F" target is fixed to a stake and centered in a cleared area approximately 10 feet in diameter. This allows the strike of the bullet to be observed for scoring purposes.

(3) Range Procedures.--In order to provide the most realistic training environment, range commands to commence and cease firing are not used in sniper exercises. The only exception to this is in the event of an unsafe condition, the command CEASE FIRING should be given immediately. Snipers must be given a thorough briefing on each exercise to include safety requirements before they are permitted to move into position. After the sniper has assumed his firing position in the designated location, he should be permitted to fire without further command. Therefore, the range must be cleared for firing before the exercises begin. The squad leader should accompany each sniper team as a scorer and observer to ensure the safety during the exercise. When the sniper completes firing, the NCO checks the sniper's rifle and signals the range officer that the weapon is clear.

(4) Conduct of Field Firing

(a) Initial Sight Setting.--After assuming a position on the firing line, the sniper sets his sights with his 400-meter zero. When targets appear at various ranges, he is required to estimate the range, apply the proper sight correction for range and wind, as necessary, and fire. This procedure is used in practice and for record firing.

(b) Adjusted Aiming Point Exercise.--Snipers should be given ample instruction in the use of an adjusted aiming point. With sights set

for 500 meters, the snipers fire at various targets appearing at ranges from 200 to 600 meters, determining the range to each target and the proper adjusted aiming point for each range in relation to the 500-meter setting. (See sec. IV, chap. 5.) If there is a wind of sufficient velocity, the sniper is required to make mechanical sight adjustments for some targets and use an adjusted aiming point for others. Sniper fire is considered precision fire; accordingly, emphasis is always placed upon sight manipulation and the correct sight setting for the range and wind factor involved for each shot. An adjusted aiming point is used only when time does not permit a sight manipulation.

(c) Instruction Firing.--Instruction firing is designed to develop speed in locating various targets, determining their range, applying the proper sight setting, and accurately engaging them. During practice, in order to provide training under various light conditions, the exercises should be conducted at least three times by each sniper; once at dawn, once at midday, and once at dusk. Instruction firing is composed of three exercises as follows:

1 First Exercise.--Each sniper is allowed 18 rounds of ammunition to hit nine modified "F" targets located at ranges of 200, 300, 400, 500, 600, 700, 800, 900, and 1,000 meters. Targets are exposed or designated singly without time limit. Only two rounds are allowed for each target. If the first round is a hit, the second round is not fired. The intervals between target exposures and the location of targets should be continuously changed so the sniper does not know when or where the next target will appear. All firing is conducted from the prone position on sandbag rests. The sniper scores 10 points for each target hit with the first round, and five points for each target hit with the second round. The highest score possible is 90.

2 Second Exercise.--The second exercise is conducted and scored in the same manner as the first exercise except that a 30-second time limit to detect, estimate the range, and fire is imposed upon the sniper.

3 Third Exercise.--In the third exercise, 18 rounds per sniper are allowed for nine targets located at the same ranges as for the first exercise. At ranges of 200 meters, the unsupported kneeling position is used. At 300 meters, the unsupported sitting position is used. At 400 meters, the supported sitting position is used. For all other ranges, the prone supported position is used. There is no time limit involved in this exercise. Scoring is identical to the first two exercises.

(d) Rules Applicable to All Exercises.--The following rules are applicable to all exercises:

1 All firing is conducted without time limit except when a time limit is indicated.

2 When the course is fired for record, adjusted aiming points are not used. A sight correction will be made for each shot.

3 For each first shot miss when there is a time limit involved, the sniper will be given an additional 15 seconds for the second shot.

4 To facilitate and expedite sight corrections during practice and for record, the second member of the sniper team is allowed to lie alongside the shooter to observe and call shots for him.

5 At ranges of 400 meters and below, only hits in the head are counted. Shots outside the head ring are considered misses. At ranges of 500 meters and beyond, a strike anywhere on the target is considered a good hit.

(e) Record Firing.--The exercises outlined above are fired for record at least once per quarter. Range operation and scoring are the same as prescribed for the instruction firing

Record Firing						
	First Exercise		Second Exercise		Third Exercise	
Target Number	1st Rd Hits	2d Rd Hits	1st Rd Hits	2d Rd Hits	1st Rd Hits	2d Rd Hits
1						
2						
3						
4						
5						
6						
7						
8						
9						
	X10	X5	X10	X5	X10	X5
Total						

NAME ______________________ RANK __________

Total Points Record Firing __________

Qualification ______________ SAT ( ) UNSAT ( )

SCORER'S NAME ______________________

Figure 72.--Field Firing Score Card.

exercises. 225 is considered a minimum satisfactory score.

(f) Score Cards.--Score cards (see fig. 72) can be reproduced locally.

APPENDIX D

SNIPER LOG

1. GENERAL

The sniper log is a factual, chronological record of his employment which will be a permanent source of operational data. It will provide information to intelligence personnel, unit commanders, other snipers, and the sniper himself. The log is not intended for use during employment but upon the completion of a mission. It should be kept in the rear area so that it will not be lost to the enemy. Analysis of the log will reveal facts that can be of benefit in future operations. The log is used to establish:

a. Identity of personnel, weapons, and organizations.
b. Areas of employment.
c. Methods of employment.
d. Average range of sightings and effective fire.
e. Results of the action taken.
f. Effects of weather.
g. Problems and recommendations.

2. SNIPER LOG INFORMATION

The sniper log should contain all facts relating to the completed mission. An example is outlined here:

a. Name, rank, and service number.
b. Type rifle and telescope with numbers.
c. Sniper's organization.
d. Organization attached to.
e. Location of employment (coordinates).
f. How employed.
   (1) Size of unit (number).

   (2) Type (patrol, blocking, etc.).
   (3) Time.
g. Communications used.
h. Sightings.
   (1) Size.
   (2) Activity.
   (3) Location.
   (4) Unit.
   (5) Time.
   (6) Equipment.
   (7) Range.
i. Action taken.
   (1) Did not fire (why).
   (2) Did fire.
      (a) Range.
      (b) Number of rounds.
      (c) Exposure and movement of target.
      (d) Results (WIA, KIA, recovery, confirmation).
j. Ammunition and casualty report.
k. Weather conditions.
l. Rifle and telescope condition.
m. Remarks.
   (1) Other information.
   (2) Problems encountered.
   (3) Recommendations.

APPENDIX E

CONVERSION TABLE

To Convert	Multiply By	To Convert	Divide By
Inches to millimeters	25.4	Millimeters to inches	25.4
Inches to centimeters	2.54	Centimeters to inches	2.54
Inches to decimeters	.254	Decimeters to inches	.254
Inches to meters	.0254	Meters to inches	. .0254
Feet to centimeters	30.48	Centimeters to feet	30.48
Feet to decimeters	3.048	Decimeters to feet	3.048
Feet to meters	.3048	Meters to feet	.3048
Yards to meters	.9144	Meters to yards	.9144

Yards to Meters	Meters to Yards
75 yards = 68.48 meters	75 meters = 82.02 yards
100 yards = 91.44 meters	100 meters = 109.36 yards
200 yards = 182.88 meters	200 meters = 218.72 yards
250 yards = 228.60 meters	250 meters = 273.40 yards
300 yards = 274.32 meters	300 meters = 328.08 yards
400 yards = 365.76 meters	400 meters = 437.44 yards
500 yards = 457.20 meters	500 meters = 546.80 yards
600 yards = 548.64 meters	600 meters = 656.16 yards
1,000 yards = 914.40 meters	1,000 meters = 1,093.60 yards

APPENDIX F

WINDAGE CONVERSION TABLE

RANGE IN YARDS	WIND VALUE	2 m.p.h.		4 m.p.h.		6 m.p.h.		8 m.p.h.		10 m.p.h.		12 m.p.h.		14 m.p.h.		16 m.p.h.		18 m.p.h.		20 m.p.h.	
		min.	in.	min.	in.	min.	in.	min.	in.	min.	in.	min.	in.	min.	in.	min.	in.	min.	in.	min.	in.
200	1/3	0	.2	0	.4	1/2	.7	1/2	.9	1/2	1.2	1/2	1.4	1	1.6	1	1.9	1	2.1	1	2.5
	2/3	0	.5	1/2	.9	1/2	1.4	1	1.9	1	2.3	1 1/2	2.8	1 1/2	3.3	2	3.7	2	4.2	2 1/2	4.7
	FULL	1/2	.7	1/2	1.3	1	2.1	1 1/2	2.8	1 1/2	3.5	2	4.2	2 1/2	4.9	3	5.6	3	6.5	3 1/2	7
300	1/3	0	.5	1/2	1	1/2	1.4	1/2	1.9	1	2.4	1	2.9	1	3	1 1/2	4	1 1/2	4	1 1/2	5
	2/3	1/2	.9	1/2	1.9	1	2.9	1 1/2	3.8	1 1/2	4.8	2	5.7	2	7	2 1/2	75	3	9	3	10
	FULL	1/2	1.4	1	2.9	1 1/2	4.3	2	5.7	2 1/2	7.2	3	8.6	3 1/2	10	4	12	4 1/2	13	5	14
400	1/3	0	.8	1/2	1.7	1/2	2.5	1	3	1	4	1 1/2	5	1 1/2	6	1 1/2	7	2	8	2	8.5
	2/3	1/2	1.6	1	3.5	1 1/2	5	2	7	2	8	2 1/2	10	3	12	3 1/2	14	4	15	4 1/2	17
	FULL	1/2	2.4	1 1/2	4.2	2	8	2 1/2	10	3	13	4	15	4 1/2	18	5	20	6	23	6 1/2	26
500	1/3	1/2	1.3	1/2	2.7	1	4	1	5	1 1/2	7	1 1/2	8	2	9	2	11	2 1/2	12	2 1/2	13
	2/3	1/2	2.5	1	5	1 1/2	8	2	11	2 1/2	13	3	16	3 1/2	19	4 1/2	22	5	24	5 1/2	27
	FULL	1	38	1 1/2	8	2 1/2	12	3	16	4	20	5	24	5 1/2	28	6 1/2	32	7	36	8	40
600	1/3	1/2	.2	1/2	4	1	6	1 1/2	8	1 1/2	10	2	12	2 1/2	14	2 1/2	16	3	18	3	20
	2/3	1/2	3.7	1 1/2	8	2	12	2 1/2	15	3	19	4	23	4 1/2	27	5	31	6	35	6 1/2	39
	FULL	1	56	2	12	3	18	4	25	5	29	6	35	7	41	8	47	9	53	9 1/2	58
700	1/3	1/2	3	1	6	1	8	1 1/2	11	2	14	3 1/2	17	3	19	3	22	3 1/2	25	4	27
	2/3	1	5	1 1/2	11	2 1/2	17	3	22	4	27	4 1/2	33	5 1/2	38	6 1/2	44	7	49	8	55
	FULL	1	8	2 1/2	17	3 1/2	25	4 1/2	33	6	41	7	49	8	58	9 1/2	66	10 1/2	74	12	82
800	1/3	1/2	4	1	7	1 1/2	11	2	15	2 1/2	19	3	22	3	26	3 1/2	29	4	33	4 1/2	37
	2/3	1	7	2	15	3	22	3 1/2	39	4 1/2	37	5 1/2	45	6 1/2	52	7 1/2	59	8 1/2	67	9	74
	FULL	1 1/2	11	3	22	4	33	5 1/2	44	7	57	8 1/2	67	9 1/2	78	11	84	12 1/2	100	14	111
900	1/3	1/2	5	1	10	1 1/2	15	2	20	2 1/2	34	3	29	4	34	4 1/2	30	5	44	2 1/2	49
	2/3	1	10	2	20	3	29	4 1/2	39	5 1/2	49	6 1/2	59	7 1/2	69	8 1/2	78	10	88	11	98
	FULL	1 1/2	14	3	29	3	44	6 1/2	59	8	73	10	88	11 1/2	103	13 1/2	117	14 1/2	132	16 1/2	147
1000	1/3	[illegible]	6	1	12	2	19	2 1/2	25	3 1/2	33	4	42	5	49	5 1/2	56	6	61	7	70
	2/3	1	12	2 1/2	25	3 1/2	37	5	50	7	69	8 1/2	84	9 1/2	97	11	111	12	121	14	139
	FULL	2	19	3 1/2	37	5 1/2	56	7 1/2	74	10 1/2	104	12 1/2	125	14 1/2	146	16 1/2	167	18	182	21	208

min. - MINUTES in. - INCHES

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Notes